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MEMOIRS

READ BEFORE THE

ANTHROPOLOGICAL SOCIETY OF LONDON.

I.—*Essential Points of Difference between the Larynx of the Negro and that of the White Man.* By George Duncan Gibb, M.A., M.D., LL.D., F.G.S., F.A.S.L., Member of the Royal College of Physicians, Assistant-Physician and Lecturer on Forensic Medicine, Westminster Hospital, etc.

(*Read January 31st*, 1865.)

In prosecuting some recent researches into the minute anatomy of the human larynx, my observations were extended to an examination of that part of the organism in the Negro. I had already made myself familiar with the elements, entering into the formation of the same part in white people, by the dissection of many hundred larynges, and was therefore prepared to note any deviation that might present itself in the coloured race. In prosecuting this inquiry, no difference was anticipated by me beforehand between the larynx of white and black people; more especially as some years back my dissections had included a considerable number of those from the black race; and at that time whatever peculiarities may have been noticed, they were not then considered of such importance as to attract the attention of scientific men.

The great impulse, however, which has been given to the study of the upper air passages within the last four years, through the revival of the laryngoscope, has led to the most careful scrutiny of every part of the larynx; and peculiarities and deviations that may have been heretofore looked upon as

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trivial, or of little moment, now are invested with considerable importance. This has become necessary towards a proper appreciation and better understanding of many obscure and painful diseases of the windpipe.

The larynx of the Negro I have carefully examined, both in the dead and living body, so as to avoid any possible chance of error. The number of my examinations to the present time has been sufficiently large to justify my arrival at certain conclusions, to be confirmed or modified by further experience. In the present communication, the subject of alterations of structure, or minute deviations inaccessible to ordinary vision, are excluded. My remarks shall be confined to alteration of form and redundancy of parts, such as can be observed in the living person, no matter of what colour his skin may be.

When the laryngeal mirror is introduced into the throat of the white man, what does it present to our observation? Firstly, the epiglottis, or cartilaginous valve which covers up the entrance of the windpipe during the act of swallowing, and rests against the back of the tongue; and the valleculæ, or large follicles at its base. The posterior part of the cricoid cartilage is then seen covered with its mucous membrane, upon which are noticed two small and conspicuous bodies,—the arytenoid, or pitcher-shaped cartilages, at the apex or summit of each of which are situated the very small round or horny cartilages, termed the tubercles of Santorini, or cornicula laryngis. The aryteno-epiglottic folds or ligaments now come into view,—a membranous expansion situated between the arytenoid cartilages and the epiglottis, in the centre of which are occasionally but very rarely seen the cartilages of Wrisberg,—cuneiform bodies, with their bases turned upwards and their summits downward. With respect to these cartilages, they are correctly stated by some of the most celebrated anatomists to be altogether rudimentary or absent in the white man, although, as just mentioned, exceptions will arise. In some of my dissections I have not found even a trace of them; and in examining as many as nine hundred living healthy white persons, of various ages and both sexes, I cannot call to mind more than four or five instances where they were

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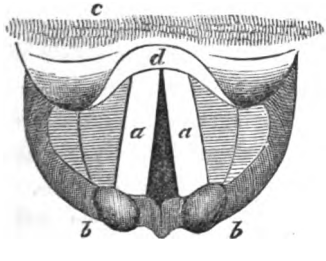
notably visible. Their presence, therefore, is exceptional in the white man.

On either side of the larynx we see the vestibule of the glottis; the superior thyro-arytenoid ligaments, or false vocal cords; the ventricles of Morgagni; and, lastly, the true vocal cords.

These last, namely, the *real vocal cords*, are seen flat and horizontal, of a white colour tinged with a shade of grey. On closure of the glottis, or space between them, the floor formed by their union continues flat and smooth, without any irregularity beyond the almost imperceptible vibrations produced by the efforts at phonation acting on their brilliant pearly, free borders.

The external border of each vocal cord is bounded by the elliptical aperture of the *ventricle of Morgagni*, the floor of which cavity is continuous with the horizontal plane of the vocal cords, with a slight inclination upwards and outwards. It follows, therefore, that the ventricle, or sinus, is situated wholly above the plane of the vocal cords, as presented to our view in the laryngeal mirror, and is, for the most part, placed quite external to the vocal cord, thus preventing our seeing into its interior. This last-named circumstance must not be forgotten. These appearances are shown in the woodcuts, Nos. 1 and 2.



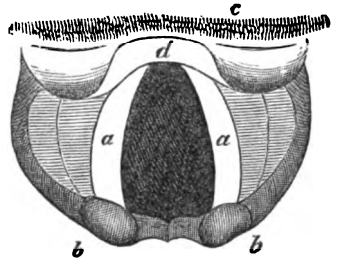


Fig. 1. *a a*. The horizontal and flat vocal cords, bounding a narrow triangular glottis; on the outer side of each cord is seen a narrow opening into the ventricles of the larynx. *b b*. The arytenoid cartilages. *d*. The epiglottis. *c*. Back of the tongue.

Fig. 2. *a a*. The horizontal and flat vocal cords, bounding a lozenge-shaped glottis; on the outer side of each cord is seen the narrow opening into the ventricles, as in fig. 1. *b b*. The arytenoid cartilages. *d*. The epiglottis. *c*. Back of the tongue.

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Having said thus much of the white man, we will now inquire, What do we see in the Negro? Unquestionably, the same parts as in his white brother, but with certain deviations in form and superadded parts, which demand our attention.

And firstly, of the cartilages of Wrisberg. These rare bodies in the white are, I may truly say, invariably present in the black race, and stand out as conspicuous objects in the laryngeal mirror, their reflection being readily visible to every experienced eye. They resemble small adipose masses the size of a small pea, and look not unlike a suppurating surface on the point of bursting, situated in the aryteno-epiglottidean fold, midway between the epiglottis and arytenoid cartilage. They are present in the old and young of both sexes; probably more fully developed in the prime of life, although seen tolerably large in the comparatively young, or those who have arrived at the age of puberty. Their constant presence in the Negro, and their frequent absence or rudimentary condition in the white man, prove them to be characteristic of the former; as much so, in all probability, as that the skin is black in the Negro from the presence of a distinct pigment in the rete mucosum, which is absent in the white man.

If no other point of difference between the two races was found than the presence or absence of this small cartilage, it is of itself alone of sufficient significance to distinguish the one from the other.

On extending our comparison further, we shall find that whilst the true vocal cords in the white race possess a horizontal or flat surface, almost in a plane with the general strike of the ventricles,—a characteristic, I may assert, to be never varying, and always constant, unless altered by disease. In the Negro, the plane of the vocal cords is more or less oblique from within outwards; *i. e.*, their internal free border is elevated at a higher angle than their external or attached border, thus giving to each vocal cord a slanting or shelving direction outwards and downwards.

This obliquity of the cords *varies in degree and extent*, but can be generally distinguished; the contrast, however, is striking between the flat horizontal surface and the oblique,

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and this is to be seen especially where the point of origin of the two cords is long, as represented in woodcut, No. 3.

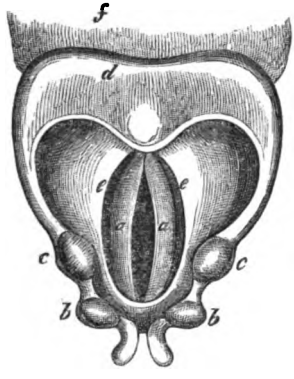

Fig. 3. The larynx of the Negro. *a a.* The oblique vocal cords, between which is a lanciform glottis. On each side of the shelving and oblique cords, *e e*, is the long and narrow elliptical opening of the pendent ventricles. *b b.* The arytenoid cartilages. *c c.* The cartilages of Wrisberg, absent in figs. 1 and 2. *d.* The epiglottis, which is the same in both races. *f.* Back of the tongue.

In the larynx of the white man, we observe the margins of the openings leading into the ventricles which exist on either side, yet immediately above the true vocal cords. The upper margin of one of these openings is placed at a right angle to the plane of the vocal cord, and is generally perpendicular to the outer border of the same vocal cord; whilst the lower margin is at the outer boundary of the cord, unless during the act of retraction of the cord outwards. In other words, the ventricle is situated external to, but immediately above the plane of the true vocal cords.

In the Negro, on the other hand, we observe a long and narrow elliptical opening (see *e*, fig. 3) which leads outwards and downwards right into the ventricle, the whole extent of which, to its very fundus, is visible in *most* black persons. The change of position in the ventricle is here most striking; for it hangs sidewise on the outer side of a shelving vocal cord in such a way that, if the cord were dry and a bead placed on

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its slanting surface, it would roll into the little bag or ventricle at its side.

The ventricle of the larynx of the Negro may be compared to the saddle-bags at the sides of a mule, whilst the sloping sides of the saddle would represent the obliquely turned vocal cords, and the summit or pommel, the glottis. The difference in the position of the ventricles in the two races is shown in the two annexed figures.

Figs. 4, 5. Fig. 4 represents a vertical section of the larynx from right to left in the white, and fig. 5, in the black man.

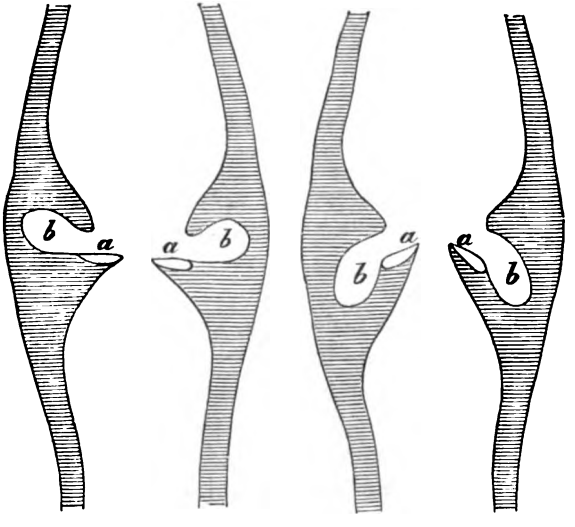

Fig. 4. *a a.* Section of the flat vocal cords. *b b.* Section of the ventricles.
Fig. 5. *a a.* Section of the oblique vocal cords. *b b.* Section of the pendent ventricles.

As the ventricles in both races are formed or surrounded by the thyro-arytenoid muscles on their inferior, exterior, and superior sides, the relative position of these muscles must necessarily be altered in the two races. This might be inferred by a reference to the annexed figure 6 (after Luschka), showing a section through these muscles and the ventricles near the point of origin of the true vocal cords in the white

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man. A reference to figure 5 will readily explain what the alteration would be.

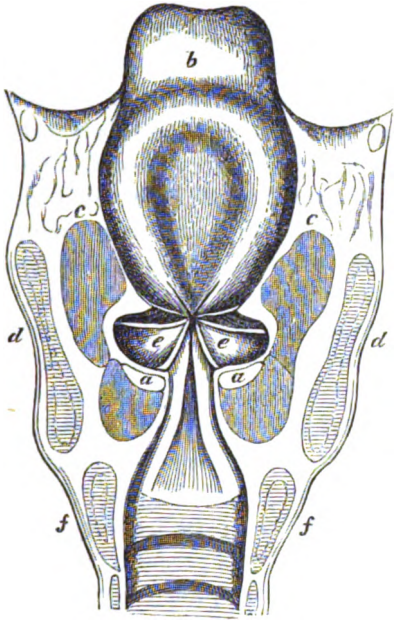

Fig. 6. *a a.* Section of the flat and horizontal vocal cords, above which are the ventricles *e e*. *b*. The epiglottis. *c c*. Section of the thyro-arytenoid muscles, the position of which must necessarily be altered in the Negro. *d d*. Section through the alæ of the thyroid cartilage; and *f f* of the cricoid cartilage.

There are still some other and minuter points of difference in the Negro larynx, but they shall be excluded here, contenting myself with the description already given of the more striking and positive deviations of form and position. These, then, as just described, are three in number, viz.:—

The invariable presence of the cartilages of Wrisberg.

The oblique or shelving position of the true vocal cords.

And the pendent position of the ventricles of Morgagni.

Anyone familiar with the dissection or examination of the larynx in ourselves, cannot but perceive that these peculiarities are not observable, unless we will admit the occasional presence of the first in certain windpipes. Now, we may be told

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by some anatomists that they have commonly seen these Wrisbergian bodies, and that they are not rare; but that sort of evidence counts for very little. A really good anatomist in London lately told me that he had turned up these cartilages every now and then, and had pointed them out to his pupils. I submitted half-a-dozen specimens of the larynx to him for examination, and he told me that all, without exception, possessed the cartilages of Wrisberg; and I found that he had all along been confounding those of Santorini with those of Wrisberg. Many of the first anatomists have confounded the two, or have thought the terms synonymous,—I may cite the names of Cuvier and Wolff among others. On the other hand, their existence in man has been denied by a not less renowned anatomist than Cruveilhier. Can it be surprising, therefore, that mistakes should occur amongst those who have not made these particular parts their special study?

I will again repeat that these small bodies, the cartilages of Wrisberg, are either very minute and rudimentary, or wholly wanting in the white race; whilst they are large and well developed, and almost always present, in the black or coloured races. It may be mentioned, also, that I have dissected them in monkeys, in whom, even the smallest species, they are relatively large in comparison to the size of their bodies; and with the object of attracting attention to them in the quadrumana, I exhibited specimens before the Pathological Society of London in March 1861, nearly four years ago.

Those who argue that the black race are inferior to the white, and approach the quadrumana in some of their features, would naturally lay hold of what I have stated to prove the truth of this theory, especially as regards the Wrisbergian cartilages and the position of the ventricles. But I take the opportunity of declaring at once, that whatever views may be entertained by anthropologists respecting the position in the scale of beings occupied by black and white, they are discarded from this communication. I simply bring forward certain facts regardless of any theory, having no special object to serve beyond that of promoting truth, and increasing our knowledge of the anatomy of a part of the body heretofore

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inaccessible to vision in the living, but now so readily seen that anyone with reasonable dexterity can investigate them for himself.

I have prepared, in a tabular form, all my recent examinations of black people, with the dates, country,—as near as could be made out,—and other little points of interest. The number examined has been fifty-nine; and in all those in whom the *inspection was accomplished without obstruction*, the *main features* or peculiarities already described were visible. They were mostly made in the presence of third parties, who recognised especially the cartilages referred to, and who were greatly struck with the singular appearance they presented. I am not unprepared with evidence of a more positive character; for in this jar is the larynx of a Negro,* which anyone desirous of doing so can examine for himself.

The question might be asked, whether the larynx of the Negro more closely approximated the same organ in the quadrumana than it did in the white man. Without desiring to touch upon any of the controversial questions appertaining to the Negro, it might be answered in the affirmative, so far as the altered position of the ventricles and presence of the cartilages of Wrisberg relate to this question. But it has been remarked by my friend, Mr. Canton, of the Charing Cross Hospital, that whilst external characters are carefully dwelt upon, not much attention has been paid to the study of internal organs; and he has instanced the peculiarity of the origin of the great vessels from the arch of the aorta in the Negro as especially pointed out by Mr. Nunn, such as exists in the quadrumana. Nevertheless, even these arterial peculiarities are occasionally seen in the white man, although more common and striking in the Negro.

To revert to the table of examinations, it will be noticed that a large proportion were among Negroes from the West Indian Islands; that is to say, twenty-six were natives of that part of the world, and, so far as could be judged by their appearance, colour, and general physique, they were of pure

* This was shown to the society.

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African descent. Nineteen were from Africa, chiefly from the western coast, including Sierra Leone, Ashantee, Gold Coast, Gambia, and Senegal. One was from Nubia, another from Abyssinia, and a third from the Cape de Verde Islands. With regard to the last-named, he was a mulatto, probably in the eighth degree, and none of the characteristics of the Negro larynx were observed in him. A dozen were from America, chiefly the southern states, in whom there might have been some mixed blood; but I would not speak positively on that point. The first fifteen in the table were *post mortem* inspections; and of those, made in the earlier years when I was a University pupil, fortunately a few notes made at the time and carefully preserved, enabled me to complete their description. Indeed, the skull of the first black which I ever examined is now exhibited, and it is typical of the race; he was from Ashantee, and I knew him personally for some years; he died of pulmonary phthisis in 1843. As has been already stated, in general terms, what the result of my examinations has been, I shall do no more here than to refer to the table itself for the particular details presented by each black.

It will probably be recollected, that the subject of this paper was brought by me before the zoological section of the British Association at Bath, in September last, and as imperfect notices of it appeared in some of the daily and weekly journals, I received letters from various correspondents relative to my investigations. One only I shall notice here, in justice to the sagacity of the writer, who is Mr. Woolmer, surgeon, 71, Warwick Square, Pimlico, a highly respectable member of my profession. He had held it as a theory for some years, that the great gulf of separation between man and other animals, as well as the lines of distinction between the various races of mankind, should be looked for in the organs of voice rather than in the brain. And in his letter to me he stated, that he was satisfied in his own mind that this theory of his, if worked out by patient research, would elevate me, or anyone else disposed to do so, to a high place amongst physiologists.

In the printed abstract of a lecture which he sent me at the same time, delivered by himself at Halesworth, in Suffolk,

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about three years ago, is the following:—"Opposite measurements, producing similar results, was a sufficient proof to the lecturer's mind that a distinctness of race ought *not* to be sought for in the skull. *In the opinion of* the lecturer it *may rather be found in the organs of speech.*"

What Mr. Woolmer's reasons may be for the adoption of his theory are unknown to me, for he has not stated them in the abstract of his lecture; but I give him the full benefit of a notice in this place, not that I have in any way sought for evidence to draw a distinction between the races of mankind, as I have already taken occasion to remark. Nor am I prepared at present to enter into the question as to the differences in phonation between the black and white races respectively, from the existing differences in the form of their larynx. But I would state my belief that the black has the power of making a louder bellowing noise than the white man, from some phonetic experiments which I endeavoured to carry out, with the laryngeal mirror in the mouth, during the period of examination. And if I might draw any inference, it would be that vocalisation is less perfect, less sustainable, and more easily weakened, than in the white man.

[TABLE.

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TABLE OF EXAMINATIONS OF THE LARYNX OF THE NEGRO.

NO.	NAME.	DATE.	PECULIARITIES OBSERVED.	COUNTRY, ETC.
1	Peter Uter.	1843.	Cart. of Wrisberg, obl. vocal cords.	Ashantee. I have his skull.
2	.....	do.	do. do. pendent ventricles.	West Indies.
3	.....	do.	*do.* *do.* *do.*	Ditto.
4	.....	do.	*do.* obl. v. c. pend. vent.	Southern States.
5	.....	1844.	do. *do.* *do.*	Sierra Leone.
6	.....	do.	do. pend. vents.	Southern States.
7	.....	1845.	*do.* *obl. v. c.* *pend. vents.*	West Coast of Africa.
8	.....	do.	do. do. do.	Southern States. Jet black.
9	.....	1846.	*do.* *do.* *do.*	Gold Coast. } But long in Southern States.
10	.....	do.	do. do. do.	Ditto. }
11	.....	do.	do. pend. vents.	West Indies.
12	.....	1847.	do. do. do.	Barbadoes.
13	.....	do.	do. *obl. v. c.* *pend. vents.*	Gambia.
14	.....	1851.	do. do. do.	Southern States.
15	James J—, 32.	Dec. 4, 1863.	Cart. of Wrisberg, obl. v. c., pen. ven.	Barbadoes. Charing Cross Hospital.
16	Lucy, age 13.	Jan. 16, 1864.	do. do. do.	Johnobey. Village two days journey from
17	Lizzy, „ 15.	„ „ „	do. do. do.	Sierra Leone = 44 miles.*
18	Thomas Pitt.	„ 18, „	do. *do.* *do.*	Western Africa.
19	.....	„ 23, „	do. do. do.	Jamaica.
20	Henry Booth.	„ 27, „	do. do. do.	Ditto.
21	Betsey ——	„ 28, „	do. *do.* *do.*	Barbadoes.
22	John Floyd.	„ 30, „	do. *do.* *do.*	Southern States.
23	.....	Feb. 2, „	do. do. not seen.	Nubia: from the streets.
24	to 30 were seven	Feb. 17, 1864.	In all these seven, excepting one, the cartilages of Wrisberg were seen very large and prominent, with tendency to obliquity of vocal cords, and the deep lateral or pendent ventricles.	All seven were jet black, and either the genuine Negro, or immediate descendants of; three or four were from various parts of Africa, whilst the remainder were from Antigua, Jamaica, etc., etc.
25	Negroes examined in the	On board H. M. Hospital ship, Dreadnought.		
26				
27	presence of Dr.			
28	Ward, Dr. Rooke,			
29	Mr. Bedford and			
30	Dr. Blanchet.			

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31	Janus Blune.	Feb. 19, 1864.	Wrisberg cart., obl. v. c., pend. vent.	New York.	
32	Ship's Cook.	„ 25, „	do. do. do.	West Indies.	
33	George Allen.	„ 27, „	do. doubtful, doubtful.	New Orleans.	
34	Reuben Polk.	Mar. 1, „	do. obl. v. c. not seen.	Georgia.	
35	John Thompson	„ 3, „	do. do. pend. vent.	United States. Pure African blood.	
36	William Smith.	„ 3, „	do. do. do.	Ditto. do. do. do.	
37	.....	„ 7, „	do. not clear.	Senegal.	
38	George Grant.	April 3, „	Small. do.	Sierra Leone.	
39	James Edmonds.	„ 4, „	Wrisberg cart., obl. v. c., pend. vent.	West Indies.	
40	Charles Wales.	„ 11, „	do. do. do.	Southern States.	
41	Henry Jenkins.	„ 13, „	do. do. do.	West Indies.	
42	Josh. ——	„ 13, „	do. do. do.	Ditto.	
43	.....	„ 15, „	Small. slight. not seen.		
44	Ben. Green.	„ 29, „	Wrisberg cart. flat. do.		
45	John Williams.	May 6, „	do. obl. v. c., pend. vent.	Barbadoes.	
46	Mrs. M. Williams	„ „ „	do. do. do.	Ditto. } Dark brown, intelligent family sent	
47	Jonah Williams.	„ „ „	do. not distinct. not clear.	Ditto. } to me.	
48	Susan Williams.	„ „ „	do. do. do.	Ditto. }	
49	.....	Jun. 25, „	Indistinct. do. do.	Western Africa.	
50	Henry Curtis.	„ 31, „	Wrisberg cart., obl. v. c., pend. vent.	Sierra Leone.	
51	David Peters.	„ „ „	do. do. do.	South Carolina.	
52	Weiroo.	July 6, „	Not seen.	Abyssinia. Jet black; beggar.	
53	——— age 27.	Aug. 17, 1864.	Wrisberg cart., obl. v. c., pend. vent.	Antigua.	
54	Brownish, 32.	„ „ „	do. do. do.		
55	G. Symonds, 25.	Sept. 7, 1864.	Wris. cart., v. c. nearly flat, but not prominent. } pend. vent.	Dominica. Jet black; examined with Mr. Harry Leach, Mr. Bedford, Mr. Smith, and Mr. Theobald Jones.	These four in the *Dreadnought.*
56	R. Rodgers, 15.	„ „ „	Wris. cart. slightly vert. pend. vent.	Jamaica.	
57	Joseph Ephil.	„ „ „	do. v. c. indistinct. do.	Antigua.	
58	Geo. Currier, 30.	„ „ „	Not seen. not seen. not seen.	C. Verde Is. Mulatto, probably in 8th deg.	
59	Henry Poshet.	Dec. „	Wrisberg cart., obl. v. c., pend. vent.	West Indies. A student.	

* Mother from Tinneh country; father from Sherbro country.

☞ The *italics* mean slight in degree.

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II.—*On the Dervishes and Hadjis of the East.* By Arminius Vambéry, Member of the Hungarian Academy. (Translated by Berthold Seemann, Ph.D., V.P.A.S.L.)

(*Read February* 14, 1865.)

The dervish is the veritable personification of eastern life. Idleness, fanaticism, and slovenliness are the features which in him are regarded as virtues, and which everywhere are represented by him as such. Idleness is excused by allusion to human impotence; fanaticism explained as enthusiasm in religion; and slovenliness justified by the uselessness of poor mortals to struggle against fate. If the superiority of European civilisation over that of the East was not so clearly established, I should almost be tempted to envy a dervish, who, clad in tatters and cowering in a corner of some ruined building, shows by the twinkle in his eyes the happiness he enjoys. What a serenity is depicted in that face!—what a placidity in all his actions!—what a complete contrast there is between this picture and that presented by our European civilisation!

In my disguise as a dervish, it was chiefly this unnatural composure which made me nervous, and in the imitation of which I made, of course, the greatest mistakes. I shall never forget one day at Herat when, after reflecting on the happiness of the early removal of the painful mask I had been compelled to wear for so many months, I suddenly jumped up from my seat, and in a somewhat excited state began to pace up and down the old ruins which gave me shelter. A few minutes afterwards, I perceived that a crowd of persons had collected at the door, and that I was the object of general astonishment. Seeing my mistake, I blushingly resumed my seat. Soon afterwards, several people came up to ask what was the matter with me, whether I was well, etc. The good people thought I was deranged; for to oriental notions a man must be out of his senses who, without necessity or a special object

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in view, suddenly leaves his seat to pace up and down a room.

As the dervish represents the general character, so he does the different peoples of the East. It is true, Mohammedanism enforces the dogma, "El Islam milleti wadihun," "all Islamites are *one* nation;" but the origin and home of the different sects are easily recognised. Bektashi, Mevlevi, and Rufai, are principally natives of Turkey; because Bektash, the enthusiastic founder of the Janissaries, and Molla Djelaleddin Rumi, the great poet of the Mesnevi, lived and are buried in Turkey. The Kadrie and Djelali are most frequently met with in Arabia; the Oveisi and Nurbakhschi Nimetullahi in Persia; the Khibali and Zahibi in India; and the Nakischebendi and Sofi Islam in Central Asia.* The members of the different fraternities are bound together by very close ties; apprentices (*murid*) and assistants (*khalfa*) have to yield implicit obedience to the chief (*pir*), who has an unlimited power over the life and property of his brethren. But these fraternities do not in the least trouble themselves about secret political or social objects, as is sometimes asserted in Europe by enthusiastic travellers, who will even have discovered freemasons amongst the Bedouin tribes of the Great Desert. The dervishes are the monks of Islamism; the spirit which created and sustains them is that of religious fanaticism; and they differ from each other only by the manner in which they demonstrate their enthusiasm. For instance, whilst one of their religious orders commends constant pilgrimages to the tombs of saints; the other lays down stringent rules for reflection on divine infinity and the insignificance of our existence; a third compels his votaries to occupy themselves, day and night, with repeating the name of God (*Zikr*) and hymns (*telkin*); and it cannot surprise us to learn that the greater number of a company,

* Sofi Islam is a sect which originated about thirty years ago. Its founder, a Tadjik from Belkh, was desirous of opposing the ever increasing influence of the Nakishbendi. In this fraternity prevails the principle of communism and blood-relationship. The Sofi Islamites wear a cap trimmed with fur, and are most frequently met with this side of the Oxus, as far as Herat, and also amongst the Turkomans.

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which has continually been calling out with all its might, "Ya hu! Ya hakk! La illahi illa hu!" are seized with *delirium tremens*. The orthodox call his condition *Medjzub; i. e.*, carried away by divine love, or being in ecstasy. A person to whom this fortunate event happens, for as such it is regarded, is envied by everybody, and, as long as it lasts, the sick and the maimed, and barren women, try to get in his immediate presence, taking hold of his dress, as the mere touch of it is supposed to have healing power.

What the dervishes are able to do during the ecstasy caused by *Zikr*, I had once an opportunity of witnessing in Samarkand. In Dehbid, close to the tomb of the Makhdun Aazaram, one of these howling companies had grouped themselves around the *pir* (chief) of that district. At first they contented themselves with repeating the formulas in a natural tone of voice, and almost in measured time. The chief was lost in the deepest thought; all eyes were fixed upon him; all ears listened attentively; and every motion of his head, or every breath that was audible encouraged his followers to utter wilder and louder ejaculations. At last, he seemed to awake from his sleeplike reflections, and as soon as he raised his head, all the dervishes jumped up from their seats like possessed beings. The circle was broken, and the different members begun to dance in undulating motion; but hardly did the chief stand upon his feet, than the enthusiastic dancers became so terribly excited, that I who had to imitate all their wild antics, became almost frightened. They were flying about, constantly dancing, to the right and to left, hither and thither; some leaving the soft meadow and getting upon the rough stones, constantly dancing, dancing; the blood began to run freely from their feet; still, they kept on their mad excitement, till most of them fell fainting to the ground.

It is the same with dervishism as with all other oriental institutions, customs, and manners; the farther we penetrate towards the east, the greater is the purity with which they have been preserved. In Persia, the dervishes play a much more important part than in Turkey; and in Central Asia, isolated as it has been for centuries from the rest of the world,

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this fraternity is still in full vigour, and exercises a great influence upon society. In my "*Travels*" I have frequently alluded to the position occupied by the *Ischan*, or secular priests, in Central Asia. Their influence may be called a fortunate one, opposite to the fearful tyranny existing in these countries. This is the reason why everyone occupies himself with religion,—everyone tries to pass himself off as a worker of miracles (*Ehli Keramet*); or, if he fails in that, endeavours to be recognised as a saint (*Velli Ullah*). Those who make the interpretation of the sacred writings their business, are great rivals of the *Ischans*, who, by the mysticism by which they surround themselves, enjoy a great share of popular esteem. The native of Central Asia, as the wildest child of Arabia, is more easily imposed upon by magic formulas and similar *hocus-pocus*, than by books. He may dispense with the services of a *mollah*, but he cannot do without an *Ischan*, whose blessing (*fatika*), or breath (*hafesi*), is required when he sets out on one of his predatory expeditions, and upon which he looks as a talismanic power when moving about his herds, his tent, or the wilds of the desert.

After the Ischans, the most interesting class are the mendicant dervishes (*Kalenter**), whom the Kirguese and Turkomans call *Kudush*† or *Divane* (insane). In the whole of the great deserts which stretch from the eastern boundaries of China to the Caspian Sea, it is only these people who, in their ragged dress, are able to move about unmolested. They do not take any notice of the differences of tribe or family; and the mighty words *Jaghi* or *Il* (friend or foe) have to them no meaning. In travelling along, they join whomsoever they meet, be it a peaceful caravan or a band of robbers. The dervishes who travel through Kirguese or Turkoman steppes are generally this class of people, who from a strong inclination to do nothing, follow a trade which, throughout the east, is considered respectable, viz., that of a mendicant. All they have to

* *Kalenter* is a corruption of the old Persian *Kelanter* (the most powerful). In Eastern Persia the title is still given to the judges of villages.

† *Kuddus* (Hungarian, *Kódus*, beggar) is derived from *Kud*, to become mad: thus the Arabs call the dervishes *Medjnun*, *i. e.*, insane.

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acquire are a few prayers and a certain power of mimicry, with which the chiromantic feats are performed; and I have never seen a nomad who has not been moved when he found himself in the close presence of one of these long-haired, bareheaded, and barefooted dervishes, who, with his fiery eyes, stared hard at the son of the desert, and, whilst shaking his *keshkul*,* howled a wild "*Ja hu!*"

The arrival of one of these fakirs in a lonely group of tents is regarded as a joyful event, almost as a festival; it is of especial importance in the eyes of the women; and the *time* of his arrival is differently interpreted. Early in the morning it signifies the happy birth of a camel or a horse; at noon, a quarrel between husband and wife; and in the evening, a good proposal of marriage to the marriageable daughters. The dervish is generally taken in hand by the women, and is well supplied with the best things the tent contains, in hopes that he may be tempted to produce from beneath his tattered dress some glass beads, or other talisman. Alms, which amongst the nomads seldom consist of money, are rarely denied to him, and he often receives an old carpet, a few handfuls of camel's-hair or wool, or an old garment. He may also stop with the family for days, and move about with it without his presence becoming a burden. If the dervish possesses musical talent, *i. e.*, is able to sing a few songs, and accompany himself on the two-stringed instrument called *dutara*, he is made much of, and has the greatest difficulty in getting away from his hospitable host.

It is very seldom that dervishes are insulted or ill-treated; this, however, is said to be the case amongst the Turkomans, whose rapacity, knowing no bounds, prompts them to commit incredible acts of cruelty. A dervish from Bokhara, of robust frame and dark curly hair, whom I met at Maymene,

* *Keshkul* is a vessel formed of half a cocoa-nut [probably some kind of gourd, as cocoa-nuts do not grow inland.—B. S.], the *vade-mecum* of the dervishes, in which he plunges all the food he has collected together by begging, whether dry or fluid, sweet or sour. Such a dish of *tutti-frutti* would but ill suit our gastronomers; and yet, how delicious it tasted to me after a long day's march!

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told me that a Telke-Turkoman, prompted by the thirty ducats which his athletic figure promised to fetch in the slave-market, made him a prisoner, to sell him a few days afterwards. "I pretended," my colleague continued, "to be quite unconcerned, and repeated the *Zikr* and *Tesbih* whilst shaking my iron chains. The time was fast approaching when I was to be taken to the market, when suddenly the wife of the robber of my liberty and person was taken ill. This prevented him from starting. He seemed to see in it the finger of God, and began to be pensive, when his favourite horse, refusing to eat his food, showed signs of illness." This was enough. The robber was so frightened that he removed the chains from his prisoner, and returned to him the things he had robbed him of, begging him to leave his tent as soon as possible. Whilst the Turkoman impatiently awaited the departure of the ominous beggar, the latter fumbled about his dress, and pretended that he had lost a comb which his chief had given him as a talisman on the road, and without which he could not do a single step. The nomad returned in great haste to the place where the plunder had been kept, and as the comb did not turn up, he became still more frightened, and promised the dervish the price of twenty combs if he would only do a single step beyond the boundary of his tent. The cunning Bokharite saw he was master of the situation; he pretended to be inconsolable about the lost property, and declared that now he should have to remain for years in the tent. Imagine the confusion of the deceived and superstitious robber! Like a madman, he ran about asking his neighbour for advice. Formal negotiations were now commenced with the dervish, to whom, finally, a horse, a dress, and ten ducats were presented, to make up for the loss of the comb, and on condition that he should leave a tent whose proprietor will probably think twice before he ventures again upon molesting a travelling dervish.

Besides the dervishes who, as physicians, miracle-working saints, or aimless vagabonds, are wandering about in Central Asia, there is a class called *Khanka neshin*, or convent dwellers, who always wish to appear as the poorest, and are, without doubt, the most contemptible fellows in the world. Generally

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speaking, they are opium-eaters, who by their excessive filth, skeleton-like body, and frightfully distorted features, present a most repulsive appearance. The worst is that they do not confine themselves to practising this fearful vice themselves, but with a singular persistency endeavour to make converts amongst all classes, and, supported by the want of spirituous drinks, they succeed but too frequently in their wicked attempts. What surprised me most was that these wretches were regarded as eminently religious, and thought that from their love to God and the Prophet they had become mad, and stupefied themselves in order that, in their excited state, they might be nearer the beings whom they loved so well.

Speaking of dervishes, we may mention a class of hypocrites who, under the pretence of carrying out sacred vows, indulge in their desire to travel, and after their return assume, under the title of Hadji, pilgrim, authority and a good social position. The Koran says, *Hidju ala beïti min isti-taátun Sebila*, = "wander to my house (*kaaba*) if circumstances permit." These "circumstances" are reduced to the following seven conditions by the commentators. The pilgrimage must be undertaken— 1. With sufficient money for travelling expenses. 2. In bodily health. 3. In an unmarried state. 4. Without leaving debts behind. 5. In time of peace. 6. Overland, and without danger. 7. And by persons who have arrived at the age of puberty. That our good Tartars ill observe these conditions will be evident to all who have some idea about the countries situated between the Oxus and Taxartes. In Persia, people go to Kerbela, Meshed or Mekka, only when sufficient funds enable them to do so comfortably. In Central Asia, on the contrary, it is always the poorest class who undertake pilgrimages. A certain taste for adventure, coupled with religious enthusiasm, are the motives which prompt the inhabitants of Central Asia to start from the remote east for the tomb of their prophet. True, they do not suffer any material losses, for "a beggar's bag is a money-bag"; but they frequently lose what is most precious to them,—their lives; as every year at least one-third of the pilgrims from Turkestan die from sheer exposure to the climate.

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This sacred or profane desire to travel braves all danger; this vague thought of tearing himself away from his family, friends, and countrymen to see the wide world, surrounds the hadjis with a certain poetry. I had lived weeks with my companions, and yet it always interested me to behold them, palm-staff in hand, as a sacred *memento* of Arabia, vigorously making their way through the deep sand or mud. They were returning happily to their homes; but how many did I meet who only commenced their long and tedious journey; and yet, they were equally happy. On my road from Samarkand to Teheran, I had as a companion a native of Chinese Tartary, who, in total ignorance of the route he had to take, asked me every evening, even when we were yet at Meshed, whether we should see to-morrow, or at the farthest after to-morrow, the minarets of Mekka. The poor fellow had no idea of how much he would have to endure before he reached his destination. However, this should not surprise us when we remember that, during the time of the crusades, so many honest Teutons undertook a pilgrimage to the Holy Land, and after two or three days' journey, hoped to behold the walls of Jerusalem.*

The routes to Arabia, adopted by the pious Tartars, are the following:—1. Yarkand,† Kilian, Tibet, and Kashmir. 2. Through Southern Siberia, Karyan, and Constantinople. 3. Through Afghanistan and India to Djedda. 4. Through Persia, Bagdad, and Damascus. None of these routes is comfortable; and the amount of danger to be incurred depends very much upon the season of the year, and the political state of the countries through which they pass. The travellers form themselves into large or small companies, and elect a chief (*Chaush*) from amongst themselves, who also fills amongst them the office of *Imam* (the person who first says the prayers

* See Noerselt's *Geschichte für Töchterschulen*; who also states, that many pilgrims, ignorant of the road, allowed themselves to be led by a frightened goose which ran before them.

† From Yarkend (Jarkend) to Kilian, on the boundary line, are three days journey; from thence by way of Tagarma and Kadun to Thibet, twenty days; and thence to Kashmir, fifteen days.

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to be repeated by the rest), and who enjoys a considerable superiority over his companions. A visit to the Kaaba and the tomb of the Prophet (which may be paid at any season) is not so much the culminating point of the whole pilgrimage as the ascent of Mount Arafat. This can be made only once a year; viz., on the Kurban festival (10th Zil, Hidji), which is nothing more or less than the sacrifice of Abraham and Isaac dramatised. All those who have taken part in this festival and have joined in the cry, *Lebeïk Allah!* "Command, O God!" (in allusion to Abraham's implicit obedience) are regarded as genuine hadjis. This cry of "Lebeïk! Lebeïk!" uttered at the most solemn moment of the whole pilgrimage, seems also to leave the deepest impression upon the pilgrim himself. My travelling companions, whenever they became excited or were in a happy mood of mind, always alluded to it; and the stillness of the Tartaric deserts was often broken by this *memento* of the stony districts of Arabia.

However painful and heart-rending may be separation from home, when so long and dangerous a journey has to be undertaken, the joy which the hadjis experience on their return, fully counterbalances it. Friends and relations, informed of his near arrival, go out to meet them several days in advance. Hymns are sung, and tears of joy are shed when the hadji makes his entry into his native place. Everyone wants to embrace him, to touch him; the atmosphere of holy places still surrounds him,—the dust of Mecca and Medina still covers his garments. In Central Asia, the hadji is held in much greater esteem than in any other Mohammedan country. It has cost him much to obtain this dignity; but he is amply repaid. Respected and supported by his fellow citizens, he is better protected against the tyranny of the governments than any other citizen. The title of a "*hadji*" is a patent of nobility which, during his lifetime, he parades on his seal, after death, on his tombstone.

The hadjis—of course such as are not mere beggars,—often transact, during their pious pilgrimage, a little commercial business. *Hem tidjaret hen ziaret*, "commerce and pilgrimage together" are not allowed by their religion; but nobody

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seems to have any pricks of conscience in taking to his co-religionist in Arabia a few articles from distant Turkomania. The products of Bockhara and other holy places of Central Asia are in high esteem amongst the people of Arabia; besides everybody wishes to show a hadji some favour, and is easily induced to pay double the value for any article offered. This small trade is carried on between the easternmost point of Islamitic Asia to the Galata bridge of Constantinople. Amongst the crowd of that famous capital, one often sees a Tartar whose features contrast as strongly with the rest of the population as the colours of his silk kerchiefs differ from those of our European manufacture. Fine ladies seldom become purchasers of such articles; but frequently one sees old matrons, inspired by feelings of piety, paying a good price for them, pressing and rubbing them hard upon their faces and foreheads, and, repeating aloud *Allahumu sella!* continue their walk.

That the ready sale of the exported articles leads to the importation of similar merchandise, needs no confirmation. No hadji leaves the holy places without making some purchases. At Mecca he lays in a stock of scents, dates, rosaries, and combs, but especially water from the sacred well called Zemzem.* In Yambu and Djidda are bought European goods; these consist of penknives, scissors, needles, thimblets, etc., and go by the name of *Mali Istambul* (Stamboul goods), as the unbelieving Franks must not obtain credit for anything. Aleppo and Damascus enjoy the reputation of supplying the best *misvak*, a fibrous root, used as tooth-brushes by all pious Moslems. In Bagdad is bought a *hirkia* of camel's hair, and made at this place of superior quality. It is this kind of garment which the Prophet is said to have worn next to his skin. Finally, in Persia ink-powder, and pens made of

* Zemzem is the name of a famous well on the road, of miraculous power, the water of which is exported in small vessels to all Islamitic countries, as a single drop of it, taken just at the moment of death, frees from five hundred years of purgatory. The origin of the well is ascribed to Ismael, who, after being left behind by Hagar, stamped his little foot, and made the well spring up.

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canes, are purchased. In Central Asia, all these articles are great curiosities, and they are paid for handsomely, partly from necessity, partly from religious motives.

Generally speaking, a caravan of hadjis—I mean one whose character has been well inquired into—are the best travelling companions in Central Asia, or rather the whole of the east, provided one can manage to agree with them. With regard to the travelling necessaries, the hadji is well supplied; and it was always surprising to me to see how a man, who had only one poor donkey he could call his own, made a display of a separate tea-service* (*à la Tartare*), pillou-apparatus, and carpet, when arrived at the station at which we halted. Nobody is more clever than a hadji in the negotiation with the people he has to deal with, be they believers or unbelievers, nomads or agricultural tribes. A hadji may be converted into anything, he being thoroughly penetrated by the principle, "*Si fueris Romæ.*" Instead of being cast down and gloomy, as his ragged exterior would lead one to suppose, he is of a merry dispostion, and during the long marches the greatest saint and miracle-worker occasionally indulges in a profane joke. The comicality of these generally serious faces has often made me forget the privations which I was myself undergoing.

* The tea-service consists of a can-like vessel, made of copper, and is, next to the Koran, the most indispensable *vade-mecum* of every travelling Tartar; even the poorest beggar carries it, suspended by the handle, about with him.

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III.—*Some Remarks on the Origin, Manners, Customs, and Superstitions of the Gallinas People of Sierra Leone.* By J. M. Harris, F.R.G.S., F.A.S.L.

The tribe or people now known under the name of "Gallinas," in consequence of their being located upon the banks of the river so called by the Spanish and Portuguese slave-traders, appears to be an offshoot of the great Mandingo nation; and from what I have gathered in conversation with the elders of the tribe, I should imagine that they migrated from the interior beyond the Koronkho country to the seaboard, about two hundred years ago.

It is not easy to ascertain the precise cause of their starting on this journey, but it was most probably undertaken for the purpose of enriching themselves by the plunder of the people whom they encountered on their route, as they carried terror into all the countries traversed by them, capturing small towns and unprotected villages, and spreading desolation wherever they passed. They might also have been originally actuated by religious motives, and a desire to proselytise the the heathen tribes which lay between their own country and the sea. But whatever was the original motive of their undertaking such a journey, it is certain that the ancestors of the actual inhabitants of the Gallinas country forced their way through some two hundred and fifty miles of country, marching from town to town, allowing such of the inhabitants as chose to do so to join them, and become amalgamated with them, and making slaves of those who refused to join them, either for their own use, or to be sent back as slaves to the country from which the emigrants started. By these means gathering strength and numbers as they proceeded, they became very numerous, and eventually reached the coast at Cape Mount.

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At the period of their advent to this place, the natives of Cape Mount had, according to tradition, suffered much from the ravages of an enormous boa constrictor, and applied to the head war-man, or leader of the new comers, to assist them in getting rid of the monster, promising him a handsome reward if successful. The chief undertook the enterprise, and slew the reptile; for which exploit he was made to assume its name, and received a more substantial remuneration in the shape of a wife, and the land on the Gallinas river, with the islands in the lagune at the bar.

The account which they give of this adventure, and of their migration from the interior, do not seem by any means improbable, and are in accordance with the present habits of the Gallinas people; as even now parties of young men frequently start off to any place in the vicinity, when war breaks out amongst their neighbours, and offer their services to either side, with a view to enrich themselves by capturing prisoners, of whom they make slaves, and carry back with them to their own homes. It is also the practice of the coast people when any dispute arises, to send messengers and presents to some one of the chiefs in the interior, asking his assistance to fight against any particular people. This chief then makes known to his family that a messenger has come "to buy war," and that he has agreed to espouse the cause of those seeking his aid. This is enough; for the people are only too glad of an opportunity of plundering, and are by no means particular as to the cause of quarrel, nor which side they take in settling it; and when once they are induced to set out and proceed to the coast, they are frequently more trouble to their friends *pro tem.*, than to their enemies. As a rule, they are arrant cowards; and after making a great parade and blustering about what they will do when they start, they require their chief to make a sacrifice to ensure their success, when, having eaten up nearly everything he and his people have, they proceed to "pull country fashion," as they term it; that is, to go through a ceremony, similar to fortune-telling or divination, to ascertain the period ordained by the fates as most propitious for making their attack upon the barricade of their enemy.

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This ceremony is frequently performed by a Mohammedan, who pretends to have gained his knowledge from what is written in the Koran, which he professes to read and study very devoutly for some time beforehand, and then asserting that he has had a dream, states that it will be necessary to make a sacrifice, consisting of such things as a white sheep with two black spots, a blye of rice, and a piece of white cloth. The sheep is killed in some sacred place; the warriors smear themselves with the blood, then cook the meat with the rice, which they devour, and proceed to make a night of it, yelling and dancing to their hearts' content. This is occasionally varied by some of the warriors, who "pull kootoo;" that is make a display of their valour by fighting with an imaginary enemy. In this way, one of them will work himself into a high state of excitement, and rush into the centre of a ring, where about a dozen others, armed with muskets (of course not loaded), swords, knives, etc., appear to be attempting to conquer this one man, who however, as a matter of course, is allowed to come off the victor; when he commences to improvise a song, in which he proclaims and glorifies the valour of his chief, boasts of what he will do, and what trophies he will bring back, etc., etc., *ad libitum*. The scene is repeated in succession by each man who has any claim to the name of warrior. This, with dancing, is kept up until their supply of rum is finished, and they, becoming tired out, drop off to sleep.

When the medicine-man finds that he can obtain nothing more from them without a show of work, he starts them off to the attack. They scatter in the bush, and work their way in small parties to some place in the neighbourhood of the town to be assaulted, when they arrange the order of battle, and generally send some lads up to the stockade, who attempt to scale it, so as to discover if the offenders are asleep, or not upon the watch; in which case, the warriors proper then come up and get into the stockade, when, by rushing about in a frantic manner from one side to the other, and cutting anyone whom they may encounter, they cause a panic amongst the enemy, who evacuate the stockade, and there being no resistance, the assailants are very brave, and chop away right and

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left. After all the fighting men have bolted, they commence making prisoners. Any man, woman, or child seized becomes the slave of the captor, and it frequently happens that those who do the least fighting obtain the most plunder.

The battle being at an end, the younger individuals of the party are set on the watch, whilst the warriors collect the prisoners and booty. On the other hand, it most often is the case, that the inhabitants of the town which is the object of the attack, are on the alert, and the watch gives the alarm if any unusual noise is heard in the bush, in which case the intended assailants run off and declare the war spoilt, saying, that their sacrifice was unsuccessful, and they return home to go through the same ceremony again; and this sort of thing continues until both sides are tired of the war and have nothing left worth plundering, when the hired mercenaries go back to their own country, generally carrying with them into slavery as many of their friends as of their foes; for when the war is over and they start homeward, "all is fish that comes to their net."

The Gallinas people, as well as their neighbours, show considerable ingenuity in the construction of the stockades above mentioned, which are generally square, with a small tower at each corner, with loopholes for musketry, or, if they have them, they mount a few small cannon, to command each angle. The fences are made of live-sticks, planted about three inches apart, and which take root quickly; these have other sticks bound across them horizontally with a very strong and pliable vine; these horizontal sticks are two or three feet above each other on the fence, which is about eight feet in height; at the top of the fence they place wicker-work, to prevent the enemy from jumping over. A second fence, of similar construction, but with the sticks nearer together, is placed about six feet within the first; and there is sometimes a third fence, but farther in the interior; where suitable wood is not easily obtainable, walls of solid mud or clay are substituted for fences; in this case the mud is first well kneaded and made into balls, which are then placed in position and left to dry, after which they are plastered over and made smooth (I have

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seen houses built in this way which would support an upper story, and after standing some time, would become like a piece of solid masonry); but usually, when their fortifications (if they deserve the name) are constructed in this manner, they have a trench or ditch between the two walls. Such stockades, as I have attempted to describe, if defended by determined men, well armed, and with a good supply of ammunition, are exceedingly difficult of capture by such ill-organised soldiers as are brought against them. I knew an instance in which a stockade, at a town called Sourah, defended by Mohammedans, successfully resisted an attack for several days, when the besiegers had recourse to fire, and so burned the garrison alive, for not one of them would surrender.

The Gallinas people still sometimes use bows and arrows, and appear to have retained many of the customs and habits of their ancestors, who I have little doubt were pure Mandingoes.

Some persons think the Gallinas are identical with the Veys; but this, I think, is a mistake, as in my opinion the Vey nation is confined to the district between Capes Mount and Mesurado; however, the Gallinas people speak the Vey language, from mixing with their neighbours. I think that the Vey language is really a dialect of the Mandingo, as is also the Soosoo, as the Mandingo is a bastard Arabic. I consider the history of the Gallinas tribe to be very interesting; and there can be no doubt that they are strangers to the country which they now possess and inhabit, as I have heard all their traditions related by King Sandfish, who was probably fully one hundred and twenty years old when he died in 1862. I have also seen the graves of the men of the tribe who first established themselves on the coast, concerning whom I could, if the limits of this paper would permit, furnish further information.

These people have apparently, for many years, acted as brokers to the slave-dealers, and for a long period depended entirely upon the slave-trade for means of obtaining food, clothing, etc., etc.; and it is only within the last few years that they have turned their attention to work, in the same manner Boom people do; when first I went to reside in the Sherbro, in

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1855, the rice purchased in the Bagroo, Jong, and Boom, was taken to the Gallinas people for sale, as the latter never grew enough provisions for themselves. The soil of the Gallinas country is sandy, barren, and unfit for cultivation; and it is a mistake to suppose, as some do, that this country produces any article of export, for it is the Crim country on the one side, and Goorah on the other, where the produce is collected. The cloths are made principally in Kissy, and find their way down to the coast as a medium of exchange for salt and other commodities. There are very many of the Gallinas people who carve wood, palm-nuts, etc., and who make wooden spoons and plates as well as iron-work of different kinds.

As a rule, the Gallinas people are inveterate gamblers; they play various games, the principal one being called by them *warri*, but it is common to nearly all parts of Africa under different names. It is played with a board having twelve holes, and forty-eight seeds. One of these boards I have the pleasure of presenting to the museum of the Anthropological Society of London, which will show the style of carving executed by the Gallinas people. They have many other games besides *warri*; and they frequently play until they have lost everything they possess, even placing their wives and children in pledge, and, as a last resource, stake their own liberty on the chances of the game.

Although really possessing no definite form of religion of their own, the Gallinas all, more or less, profess Mohammedanism; and the chiefs usually send their sons into the interior for several years to learn the Mandingo tongue. They are excessively superstitious, and have almost unlimited belief and confidence in anything made by any bookmen; that is, people who have a written language, as Mohammedans, or Europeans, Americans, etc. Of this weakness and credulity the Mohammedans take advantage, and make charms by writing a few words from the Koran on paper or parchment, which they sew up in cloth, or put in goat or sheep horns, and cover them with leather. These charms can of course be made to counteract any evil influence according to the wish of the purchasers; and some are supposed to have the virtue of resisting

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lead or steel, but generally the wearers or possessors object to have the test applied by a white man, as they say he is a bookman. Another indispensable requisite is that the wearer should be in fighting trim, and place implicit confidence in the charm, as a want of faith entirely destroys its efficacy. Singularly enough, they hold a crucifix to be the most efficient charm, which is locally called a balsam, and they imagine that with this on their person nothing can harm them; this is doubtless derived from their seeing the Portuguese slavers constantly wearing a crucifix, as they suppose for protection.

One of the most noteworthy of their institutions is the *porra*, which, under different names is, I believe, common to most parts of Africa. Amongst the Gallinas, the *porra* is of two kinds,—religious and political: the women have also a similar institution of their own, called *boondoo*, to which men are not admitted. The porra is to my knowledge practised as far as Sugary. I have been in "porra bushes" at Sugary, on the seaboard, and at Firo, in the interior, to the east, where I have met messengers from the chiefs of the Vey country, which lies, as I have before said, between Cape Mount and Cape Mesurado; and from this I infer, that they have also the porra in that country. No person is admitted into the religious porra without being circumcised; he must also live in the porra bush, apart from the rest of the population, for a certain time, during which time no female must set eyes on him, and he is supposed, in country *parlance*, to have been eaten by the porra devil. After his initiation, when he is about to be released from the porra bush, a porra name is given to him, such as *Banna Cong*, etc., etc., and he is then supposed to have been delivered from the belly of the porra devil. The ceremony of the initiation of neophytes is only performed twice a year, and the number of men and boys brought out in this manner at one town, upon each occasion, frequently amounts to fifty. It is a time of great rejoicing; a holiday is kept at the town in which it takes place, and dancing, drinking, feasting, firing of guns, etc., is kept up, night and day, until their supplies are exhausted.

The second kind of porra—the political—appears to be more select than the former, and is chiefly used for the purpose

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of arranging the affairs of the nation, settling disputes between different tribes or sections of tribes, and also for enforcing the laws of the country in cases of dissensions among the people. It immediately stops any quarrel which is supposed to be taken in hand by the chiefs for settlement, and the matter in dispute has then to be argued in the *barry*, by both parties, before the chiefs and head men, who sit as a jury. This porra frequently meets in cases of war between two tribes, with which, however, it has no connexion, and steps in between the belligerents to settle the dispute and stop the war. The people comprising the porra deputation are always held sacred; and should any of them be injured by either party, the whole of the tribes would take the matter up. The porra, I believe, originated with the Mendi and Timmanée Mo Banta people. Native Mohammedans from the interior do not join the religious porra; but many of the Creole Mohammedans (by which term I mean Mohammedans born in the country) join the porra, with a view of preventing the chiefs from planning anything injurious to them without their knowledge. Any plot which is being concocted by the chiefs against an individual, is always first talked over in the porra bush, all the members of the porra being under oath not to divulge it, so that the people, always jealous of the influence obtained by Mohammedans in their country, yet afraid of their power as a religious sect, concoct measures to injure them in the secret porra bush; and it is common for them to form a porra for any special purpose,—such as sending a deputation to any neighbouring people to buy their aid in getting up a war against another tribe, and many other matters in which assistance is required. In political porras, all porra-men are not admitted, but only those of great influence, or trustworthy slaves. I have been present at porras where no person but an undoubted chief has been admitted.

In my long intercourse with these people, I have seen many phases of this institution, but can scarcely explain them all in this short paper.

The *boondoo* is an association very similar in character to the porra, but it is peculiar to the women; the ceremonies are

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much the same as those of the porra. There is a boondoo bush as well as a porra bush, which is kept as jealously sacred from the men as the porra bush is from the women. The usual mode of procedure is to take girls of eight or nine years of age into the bush, situated in the densest part of the forest, where they are kept under the strictest surveillance by the old women who have charge of the bush. After the girls have been a certain time in the bush, they learn the songs and dances with which they accompany almost every occupation of their lives, such as working at their farm, carrying water, paddling canoes, preparing food, funerals, and weddings,—in fact, there is scarcely a meeting of half-a-dozen boondoo women without an accompaniment of this dismal chanting. The novices having completed their education in this respect, they are operated upon at certain phases of the moon in a manner similar to that of the porra men, the *clitoris* being excised: this operation is, I believe, always performed at midnight, and when the moon is at the full, the women remaining in the bush all night, singing, dancing, and "making night hideous." After this operation, the backs and loins of the girls are cut in such a manner as to raise and leave marks of certain forms in a kind of relief; how this is done I cannot say, but I have seen many girls and women having their loins covered with these scars, about the eighth of an inch above the surface of the skin. I should imagine that the effect desired is produced by keeping the wound, when fresh made, irritated by some substance, so that when healed the lumps remain. This scoring is entirely distinct from the tattooing of the New Zealanders, and the tribal marks of the Kroomen. After their initiation, and other ceremonies, the girls have new names given to them, which are called boondoo names; such as Taroo, Sattiah, etc. When they have the boondoo bush, the girls can recover a fine from all who do not call them by their boondoo names. The girls do not, however, remain long in the bush after the necessary rites are completed and they have recovered from the operation incidental to the occasion, but there is a ceremony to be gone through on their departure, called "pulling them from the boondoo." In connexion with

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the boondoo, there are two or three "devils", but these, unlike those of the porra, may be seen by the general public.

The "devils" are said to be the oldest women of the town; but this I do not believe, as from the violent exercise they go through in dancing, and from their generally erect posture, I should think none of the old women would be capable of supporting the fatigue which these "devils" undergo on certain occasions; in fact, it is my opinion that the *rôle* of the "devil" is played by a strong and active young man. The dress of the "devil" comprises a mask made of the bark of a tree, and which goes completely over the head and rests on the shoulders, similar to a theatrical mask; it has long grass by way of a wig, and a long robe of cloth hangs to it, the feet and legs being also hidden by other cloths pendant from the waist and knees, and over all is a fringe of long grass which completely covers the performer, and when agitated gives him a most peculiar appearance; the "devils" each carry a small broom, and looking at the frightful appearance presented by the whole make up, they are not altogether unworthy the name they usurp. The girls, when removed from the boondoo-bush, are not allowed to wear any ornaments, such as beads, etc., so they substitute pieces of wood stained of different colours, which they string together, and wear round the waist, as well as coloured straws strung together in the same manner. As a badge of maidenhood, they wear a long narrow strip of cloth, about an inch and a half wide, and nine or ten yards long,—this is worn by other virgins as well as the boondoo girls; but the distinctive mark of a boondoo girl, when unmarried, is a small black shell, shaped like that of a whelk, in which the boondoo women put a *gri-gri*, or charm, and stop the orifice with wax, into which they stick three small red beads,—this appendage they are not on any account allowed to remove. The boondoo girls remain in the position of novices until given in marriage by the family to some man who demands their hand; the suitor, if accepted, must then incur the expense of having his bride elect "washed from the boondoo", which ceremony is usually performed when the bridegroom is ready to take his bride home, that is to say, on her reaching the age of puberty.

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When the wedding day arrives, the girl is attired in her bridal dress, with beads, silver chains, and other ornaments, and the day is spent in feasting, dancing, etc., as is usual with these people on all important occasions. Two of the boondoo girls, companions of the bride, perform the boondoo dance, and are dressed for the occasion in jackets ornamented with beads, and skirts made of the boulow grass, which, being very full, give them somewhat the appearance of our ballet-girls; indeed, many of the attitudes into which they throw their lithe bodies, and some of the difficult and intricate *pas* which they execute, would be received with applause in any of our theatres. The accompaniment to which they dance is the sound of the drum (an instrument without which no town would be complete), and the voices and clapping of hands in time of the women and girls, who stand in a ring, as also to the music of some small hollow pieces of iron which are attached to the legs of the performers, and jingle with every movement.

The boondoo laws are very strict in the Gallinas country; and any man proved to have had intercourse with a girl during the time of her novitiate, would, if a poor man and a slave, be stripped of all he possessed, and possibly killed; if a free man,—rich, and of good family,—a fine so heavy would be inflicted that the payment thereof would, very probably, entail ruin on him and all connected with him. I have never known the observances of the boondoo carried out so strictly as by the people residing within the limits of the country between the northern border of the Gallinas and Cape Mount, and extending back in the interior as far as the Goorah country. The people of Sherbro' have the boondoo, but do not practise it so strictly as the Gallinas. The Soosoo people, to the northward of Sierra Leone, have an institution called the *Seimo;* but I am not aware if it is known in other parts of Africa, and rather think that it is not, as many of the liberated Africans in Sierra Leone—among whom are to be found individuals of nearly every West African tribe—have told me that no such institution exists in their country.

The origin of the custom must, I think, be attributed to

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polygamy; as the idea entertained by the natives is, that after the women have undergone the operation I have mentioned, they are less lascivious than they would otherwise be; and as it is a common thing for a man to have twenty wives or more, if he can afford to get them, he not being able to keep them all in his house, without some such means of keeping their desires in check, believes that he thus relieves himself from their importunities, and also removes, in a great measure, their inclination to intrigue with others, of which he is very jealous.

Another custom, common to the Gallinas and all parts of west Africa, is also the result of polygamy, and has been adopted for much the same reason; I allude to the practice of the wife having no intercourse with her husband, or any other man, from the time of the birth of a child until it is able to walk and talk, as they imagine that in the event of the mother having carnal connexion during the period that the child is being suckled, which frequently extends over two or three years, that the infant will die. Whether the men believe this themselves, I cannot affirm; but they always impress the women with a conviction of its truth, with a view to induce them to be less troublesome to their husbands, and less likely to indulge in illicit intercourse with others.

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IV.—*On the Testimony of Local Phenomena in the West of England to the Permanence of Anthropological Types.* By John Beddoe, M.D., M.A., F.A.S.L., Foreign Associate of the Anthropological Society of Paris.

Having for some years been endeavouring to apply the numerical method to the determination of some of the problems of anthropology, and in particular of the question of permanence of types, I long ago conceived the idea that something like a crucial instance might be found in the comparison of the population of certain cities with that of the surrounding country.

It is not an uncommon opinion, that dark eyes and hair are more frequent in towns than in the open country, owing to some unknown or undefined influences operating therein upon the human race, independently of any differences in the breed. With some, this opinion has taken the formula that civilisation has a tendency to darken the average complexion; and it is not long since an article "On the Probable Extinction of Blue Eyes," which was said to be based on scientific observations, amused the readers of a popular magazine.

It would be easy enough to show that some of the darkest races in these islands are among the least civilised, both materially and intellectually; but there is really some foundation for the belief that in England, at least, there is a preponderance of dark hair and eyes in the towns as compared with the rural districts. I shall endeavour presently to show how this may be accounted for; but will first remark, that the phenomenon repeats itself in Belgium and Germany in a more striking manner. Thus at Antwerp, Louvain, Huy, Cologne, Düsseldorf, Münster, Aachen, Brunswick, Leipsic, and even at Prague, I have found the citizens darker than the peasantry; and if the contrary is the case at Vienna, and perhaps at Liège and Namur, both cases are easily explicable,—the Liegeois peasantry are a Walloon

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promontory in a Teutonic sea, and the Viennese are mostly Germans; while the eastern part of Lower Austria remains to a great extent, as I believe, Avar, but certainly Turanian, to the present day.

It would require an intimate acquaintance with the internal or social history of Germany, to enable one to give an opinion as to whether the phenomena I have observed in the German towns just mentioned, are capable of being accounted for by the admixture of alien blood. It somewhat staggered me to find that the difference between the citizens and peasants was most strongly marked at Cologne; for Cologne appeared to me to be precisely the place in which one might expect the law of natural selection to operate in that direction. Its close, narrow, filthy streets must be a most unfavourable *habitat* for children; and I have a strong impression—unconfirmed, I must admit, by any numerical or other test—that the more irritable constitution, which so often accompanies the xanthous complexion, renders fair children more difficult to rear under such unfavourable circumstances than others.

Any evidence that I have been able to collect in Ireland has been rather favourable to the doctrine of permanence of type. The townsmen of Cork and Youghal have lighter hair than the peasantry of most parts of the country; and this is precisely what might have been expected from the history of Danish and English colonisation there. Nearly the same may be said of Enniskillen, and perhaps, though with less certainty, of Galway and Killarney. At Sligo, I found more dark hair among the citizens. Dublin, Waterford, Wexford, and Kilkenny, all appeared to have populations fairer than those of Ireland in general, as might have been expected; but I had no opportunity of drawing a satisfactory comparison between these four cities and the rural districts around.

From Scotland I have very little evidence. There is more dark hair in Edinburgh than in the neighbouring country, but not more, perhaps, than in most parts of Scotland; and the population of Edinburgh has always been largely recruited from distant Celtic districts where dark hair prevails. Of 1029 adults, who passed under my observation at the Edin-

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burgh Royal Infirmary, 385 were natives of Edinburgh and other considerable towns; on an average, they had rather lighter hair and rather darker eyes than those born in rural districts and small towns.

In almost all the towns of the Saxon and Danish parts of England where I have made observations, the citizens appeared to be, more or less, darker than the peasantry of the neighbourhood. So far there is no difficulty in accounting for the facts; for while immigration into the rural districts has been almost *nil*, most of the towns have received accessions to their population from Ireland, Wales, the west of England, or the Continent. The difference between the two classes seems to disappear as we proceed westward, and at Truro is distinctly reversed.

Unable to come to a conclusion upon the data of which I have given you a cursory view, I resolved to utilise for the purpose the materials presented to me in the course of my hospital practice at Bristol; and having amassed careful observations on 4,400 adults, almost all patients of the Bristol Infirmary and Clifton Dispensary, I have tabulated the sex, birthplace, and colour of the eyes and hair of all of them. The system of division and nomenclature which I have adopted is the same which I have employed for many years, and which my friend, Dr. Barnard Davis, has made use of in the *Crania Britannica*.

I distinguish but three colours, or rather, as M. Broca says, shades or tones of eyes,—light, neutral, and dark; and five of hair, red, fair, brown, dark brown, and black; and in comparing the tendency to darkness of hair in any two sets of people, I take 100 of each, and then subtracting the red, plus the fair, from the dark brown, plus twice the black, obtain a cipher which compendiously represents that tendency, and which I call the *index of nigrescence*. For example: this index is, in the fair populations of Friesland, Lower Saxony, Westphalia, and the Lower Rhine, a minus number; it is so also in some of the Scandinavian districts of our own island. In most of the principal towns of England it varies between 10 and 30; and in the Celtic districts of the far west of Ireland,

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the Highlands, and Wales, it ranges from 30 to 50, 60, or even 70.

At first sight, one might suppose that so wide a numerical basis would allow of a perfectly positive induction being erected upon it. There are, however, several drawbacks to the value of these data, of which it may be well to specify the principal ones.

Bristol is not the most favourable locality that might have been selected for such an investigation as this. It is true, that no numerous foreign colony is known to have settled in it at any time, as has been the case of many other towns; nor has any rapid and conspicuous development of prosperity, in this century of cheap and easy locomotion, attracted to it the crowds of foreigners, and other strangers from a distance, which have swelled the census of the great manufacturing towns of the north, threatening to confound or nullify all local distinctions of race. The population of Bristol is, and probably always has been, unless in those days when it was the common slave-market of Britain, recruited almost exclusively from districts at no great distance. But, unfortunately for my purpose, those districts are almost as diverse in their ethnological as in their geological character. Within a circle, whose radius is forty or fifty miles, are included the Saxons of the Cotswolds and of Central and North Wilts, the Celts of the Quantock Hills, the Kymry beyond the Usk, and a variety of mixed or doubtful breeds of men nearer home. All I can do, then, is to strike an average of all these in the proportions in which they do contribute, or may be supposed to have contributed immigrants, and to compare this average with the native Bristolians.

Hospital patients probably furnish a sufficiently good sample of the population, but not a perfect one. Persons of the melancholic temperament, I am disposed to think, resort to hospitals more frequently than the sanguine, under like circumstances.

Lastly, it may be mentioned that the proportions of the sexes coming from the several districts varied considerably, but not to such an extent as to affect the validity of my calculations.

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Of the 4,400 persons observed, about thirty-eight per cent. were born in the city of Bristol, and about seven in the suburbs. Of the remainder,—to whom we must look for the sources of increase of the population,—two-fifths were natives of the rural districts of Somersetshire and Gloucestershire; one-fourth, of the towns situated in those counties, or in Devon and Wilts, or of the metropolis; and the residue came mostly from the nearer parts of South Wales, from Munster, from the rural districts of Devon and Wilts; and in smaller proportions from Herefordshire, Dorset, Cornwall, and more remote counties. Observation of the surnames most prevalent in Bristol leads me to think that Somersetshire, still the chief recruiting ground for the city population, must in former times have contributed still more largely; and that the immigration from South Wales was formerly greater than it is at present.

We may expect, therefore, to obtain some light on the question at issue, by comparing the native Bristolians, firstly, with the whole residue of persons observed; and secondly, with those from the least distant districts; and we may then proceed to compare the natives of the surrounding towns with those of the open country. For the sake of brevity and clearness, I will speak only of the index of nigrescence, and of the proportion of dark eyes to light, the latter being always reckoned as 100.

I find, then, that the Bristolian index of nigrescence is 1 below that of the remainder; but that the proportion of dark eyes to light is higher by 9 per cent. In the eastern part of Somerset, the ratio of dark eyes is exactly as in Bristol; but the index for the hair is higher in the proportion of 39 to 33½. In the whole county, including the Celtic population of the west, the eyes grow lighter by 6 per cent.; but the hair is still darker, exceeding that of Bristol by 9. In the county of Gloucester, excluding the Forest of Dean, the eyes are lighter by 4, and the hair by 7. And in the four counties of Somerset, Gloucester, Devon, and Wilts, taken together, still excluding the towns, the hair is darker than in Bristol by 2½, and the eyes lighter by 7. In the suburbs of

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Bristol, viz., Clifton, Bedminster, and St. George's, the conditions are reversed, the eyes being a shade darker, but the hair considerably lighter; and with these the city of Bath almost exactly agrees.

The evidence to be drawn from a comparison of the four counties just mentioned, with the towns which they respectively contain, tends very much in the same direction. The towns of Somerset, whether we include or exclude the peculiarly situated city of Bath, exhibit lighter eyes, and hair lighter to an extraordinary degree, than the surrounding country. In the towns of Devon, the eyes are darker, but the hair rather lighter than in the rural districts; in Gloucestershire, the proportions are exactly reversed; in Wiltshire, again, the relations are the reverse of those in Somersetshire. When the counties and the towns are each taken together, the former exhibit the darker hair, but the eyes are almost exactly the same.

On the whole, the figures appear to me sufficient to disprove the common opinion of the darkening effect of a town life, at least so far as it relates to the hair; while they leave it undecided whether the colour of the iris can be affected by such agency.

On the other hand, it is satisfactory to note how the bewildering confusion of the figures I have been summarising, inexplicable, as I incline to think, by any theory of the influence of extrinsic causes on the physical type, falls into something like order when viewed in connexion with ethnographical history and probabilities. These explain at once how it is that the natives of a town, descendants of a shifting and migratory population, almost always tend more towards the general standard of the country, than do those of the neighbouring rural districts. The hypothesis, the truth of which few or none doubt, that the invading Teutons were fairer than the prior inhabitants of this part of Britain, explains at once why we find a regular gradation from light hair to dark as we proceed from the Saxons of Wilts through Gloucestershire, East and Middle Somerset to North Devon, and then to West Somerset and South Devon,—a gradation which appears to

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me to be attended with a gradual change in the prevailing forms of the cranium,* if not of the trunks and limbs. Beyond the Severn, in like manner, the physical type becomes more purely Kymric (or Kymro-Iberic?) as we proceed from the coast towards the mountainous interior. In the coast districts and low lands of Monmouthshire and Glamorgan, the ancient seats of Saxon, Norman, and Flemish colonisation, I find the indices of hair and eyes so low as 33·5 and 63; while in the interior, excluding the children of English and Irish immigrants, the figures rise to 57·3 and 109·5,—this last ratio indicating a prevalence of dark eyes, surpassing what I have met with in any other part of Britain.

In laying down just now the rule, that in this part of England the amount of dark hair coincides with and indicates the amount of pre-Teutonic blood, I must guard myself from being supposed to ignore the differences of type and of race which may have existed before the landing of Cerdic. I have but just mentioned one of the peculiarities that distinguish the Kymro-Iberic from the Gaelic Celt, or, to put aside theory as much as possible, the pure Welshman from the pure Irishman,—I mean the much greater frequency of dark eyes. Both these races I believe to have been represented in the west of England. Nor do I wish to undervalue the possible effects of that miscellaneous and promiscuous colonisation of Britain by the Romans, which has been investigated by Mr. Wright with his accustomed ability, and of which, I think, I have observed some traces in the course of the present inquiry. The majority of such colonists, and of the aboriginal tribes, would probably be dark haired; and unless we admit that they were so, and that they have transmitted this characteristic to their descendants, I can at present see no possible explanation of the phenomena which I have briefly laid before you.

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* The most common form in the west is that which my friend, Professor Wilson, of Toronto, in his recent paper on the "Physical Characteristics of the Ancient and Modern Celt," characterises as the pear-shaped, or British-Celtic type. My own observations on this subject are hardly ripe for publication.

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ACTUAL NUMBERS OBSERVED.

	Eyes Light.					Total.	Eyes Neutral.					Total.	Eyes Dark.					Total.	
	R.	F.	B.	D.	N.		R.	F.	B.	D.	N.		R.	F.	B.	D.	N.		
Bristol	47	183·5	401·5	226 5	4·5	863	8	19·5	91·5	122·5	10·5	252	13	14·5	125	335	54·5	542	1
Clifton	1·5	7	13	7·5	....	29	....	1·5	6	2	·5	10	....	1	3	13·5	3·5	21	2
Bedminster	....	8	14	6	1	29	....	2·5	2·5	5·5	·5	11	1·5	1·5	6·5	13	3·5	26	3
St. George's	8·5	18·5	44·5	17·5	1	90	....	4	15·5	8·5	1	29	....	1	18	31	5	55	4
Suburbs of Bristol	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	....	5
Pill	....	2	8·5	4·5	....	15	....	....	....	4	....	4	....	....	1	6·5	1·5	9	6
Bath	4	13	13·5	10·5	....	41	....	·5	6	5·5	....	12	....	2	2·5	13·5	5	30	7
London	3·5	10	23	15	1·5	53	....	....	·5	4·5	....	5	....	....	4	11·5	1·5	17	8
Somerset, towns	2·5	27·5	47·5	27	1·5	106	1·5	1·5	14	8·5	·5	26	·5	·5	9	22·5	11·5	44	9
Ditto, country, east	10·5	42·5	103·5	65·5	2	224	1·5	2·5	12·5	30	2·5	49	4	5	23·5	94·5	15	143	10
" " south	....	3	6·5	8·5	....	18	....	....	·5	3·5	....	4	....	....	....	2	....	2	11
" " west	·5	6·5	34	28	....	69	....	....	7·5	11	1·5	20	1	....	5	20·5	4·5	31	12
" "	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	....	13
Glo'stershire, towns	1	9	29	12	1	52	1	....	7·5	6 5	....	15	1	·5	6·5	16·5	2·5	27	14
Ditto, country	14 5	44	101	....	....	207	5·5	10	27	31·5	2·5	76·5	2·5	3	23·5	82	10·5	121·5	15
Forest of Dean	....	1	3	....	..	4	....	....	3	2	....	5	....	....	2	6·5	·5	9	16
Wilts, towns	....	9	17·5	9	·5	36	....	·5	10·5	3	....	14	....	....	4·5	14·5	....	19	17
Ditto, country	·5	7·5	35·5	10·5	....	54	....	2·5	4	7·5	....	14	....	·5	5·5	9·5	·5	16	18
Whole of Wilts	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	....	19
Devon, towns	5	6·5	23	18·5	....	53	....	1·5	7	5·5	2	16	1	....	5·5	26	5·5	38	20
Ditto, country	1·5	6·5	30·5	14·5	1	54	....	1·5	4·5	11	2	19	....	1	1·5	21·5	4	28	21
Dorset	1	4·5	4·5	5	....	15	....	....	1	2	1	4	....	·5	·5	10·5	·5	12	22
Cornwall	1	3·5	6·5	4	....	15	....	....	2·5	·5	....	3	....	1	4	4	3	12	23
South Wales and Monmouth. coast	4·5	13	20	16·5	....	54	....	....	1·5	7	·5	9	1	....	10	19·5	3·5	34	24
Ditto, interior	3	3·5	15·5	10	....	32	....	·5	5·5	8	1	15	....	....	7	22	6	35	25
Pembrokeshire	....	....	....	4	....	4	....	....	4	5	....	9	....	....	....	4·5	1·5	6	26
Wales—total	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	....	27
Hereford., Cheshire Salop, Staffordsh., Worcestershire, Warwickshire	3·5	8·5	14	6	1	33	2	....	1	4·5	1·5	9	...	....	·5	12·5	5	18	28
East of England to the Welland	2·5	9·5	26·5	9	·5	48	1	1	6	3·5	·5	12	....	1	4	12·5	1·5	19	29
North of England	2	10·5	12·5	2	....	27	....	....	4·5	2·5	....	7	....	....	2·5	5·5	2	10	30
Ulster, Dublin, and Wexford	2·5	4	9	5·5	....	21	1	....	1	7	....	9	....	....	....	2	....	2	31
Cork, Waterford, and Kerry	3·5	4·5	26·5	34	1·5	70	·5	·5	6	13	2	22	....	....	·5	12·5	2	15	32
Tipperary, Limerick	2·5	3·5	7·5	5	·5	20	....	....	·5	3·5	....	4	....	....	....	7	....	7	33
Rest of Ireland	....	1	6	·5	·5	8	....	....	....	....	....	..	....	....	....	1	....	1	34
Scotland	....	4·5	4·5	2	....	..	....	·5	1·5	1	....	..	....	....	....	....	....	....	35
Total	126·5	475·5	1102	633	18	..	22	50·5	255	330	30	687	25·5	33	282·5	833·5	154	1348	

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PERCENTAGES.

	Grand Total.	Of whom Males.	Eyes Light.					Total.	Eyes Neutral.					Total.	Eyes Dark.					Total.	Index of Nigrescence.
			R.	F.	B.	D.	N.		R.	F.	B.	D	N.		R.	F.	B.	D.	N.		
1	1657	562	2·8	11·2	24·2	13·7	·3	52·1	·5	1·2	5·5	7·4	·6	15·2	·8	·9	7·5	20·2	3·3	32·7	33·6
2	60	31	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	....	33·3
3	66	24	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	21·8
4	174	68	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	22·4
5	....	....	3·3	11·2	23·8	10·3	·7	49·3	....	2·6	8	5·3	·7	16·7	·5	1·1	9·2	19·1	4·	34	26·6
6	28	3																			
7	83	36	....	....	....	....	....	49·3	....	....	....	....	....	14·6	....	....	....	....	....	36·1	24·1
8	75	21	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	31·3
9	176	55	1·4	15·6	27	15·3	·8	60·2	·6	·8	7·9	4·8	·3	14·7	·3	·3	5·1	12·8	6·5	25	29
10	416	147	....	....	....	....	....	53·8	....	....	....	....	....	11·8	....	....	....	....	....	34.4	39·1
11	24	10																			
12	120	60	....	....	....	....	....	57.5	....	....	....	....	....	16·6	....	....	....	....	....	25·8	52·9
13	....	....	1·9	9·3	25·7	18·2	·3	55·5	·2	·4	3·6	7·9	·7	13	·9	·9	5·1	20·9	3·5	31·4	42·4
14	94	39	1	9·6	30·8	12·7	1	55·3	1	....	8·8	7	....	16	1	·5	6·9	17·5	2·6	28·7	31·4
15	405	120	3·6	10·8	24·9	11·7	....	51·1	1·3	2·5	6·7	7·8	·6	18·9	·6	·7	5·8	20·2	2·6	30	26·5
16	18	4																			
17	60	24	....	....	....	....	....	52·2	....	....	....	....	....	20·3	....	....	....	....	....	27·5	26·1
18	84	29	....	....	....	....	....	63·3	....	....	....	....	....	16·6	....	....	....	....	....	19·	20·8
19	....	....	·3	10·8	34·6	12·7	....	58·6	....	1·9	9·5	6·5	....	18·3	....	·3	6·5	15·7	·3	22·9	23·2
20	107	31	4·7	6·1	21·5	17·3	....	49·5	....	1·4	6·5	5·1	1·9	15	·9	....	5·1	24·3	5·1	35·5	47·6
21	101	45	1·5	6·4	30·2	14·3	1	53·5	....	1·5	4·4	10·9	2	18·8	....	1	1·5	21·3	3·9	27·7	50
22	31	10																			
23	30	12																			
24	97	19	....	....	....	....	....	55·7	....	....	....	....	....	9·3	....	....	....	....	....	35	33·5
25	82	29	....	....	....	....	....	39	....	....	....	....	....	18·3	....	....	....	....	....	42·7	57·3
26	19	6																			
27	....	....	3·8	8·3	17·9	15·4	....	45·4	....	·2	5·5	10·1	·7	16·6	·5	....	8·6	23·2	5·5	37·9	48·5
28	60	38	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	40·
29	79	33	....	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	19·
30	44	19	...	....	....	....	....	..	....	....	....	....	....	..	....	....	....	....	....	..	3·4
31	32	7																			
32	107	50	...	....	....	....	....	65.4	....	....	....	....	....	20.5	....	....	....	....	....	14	57·5
33	31	15																			
34	9	3																			
35	14	9																			
	4400	1544	2·9	10·8	25	14·4	4	53·7	·5	1·15	5·8	7·5	·7	15·6	·6	·7	6·4	19·4	3·7	30·6	34·2

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V.—*Maya Hieroglyphic Alphabet of Yucatan.** By WILLIAM BOLLAERT, Hon. Sec. A.S.L., Corresponding Member of the University of Chile, of the Ethnological Societies of London and New York, etc.

RECENT DISCOVERY OF AN AMERICAN ALPHABET.

IN September 1864, I had the pleasure to meet in London the indefatigable Abbé Brasseur de Bourbourg, then on his journey, about to leave for Mexico and Central America, as one of the scientific commission sent by the French Government to explore those regions. He presented me with a copy of his last work (in Spanish and French), entitled, *Relation des choses de Yucatan de Diego de Landa*, 1566; *comprenant les Signes du Calendrier et de l'Alphabet hieroglyphique de la Langue Maya, accompagné de Documents divers historiques et chronologiques, avec une Grammaire et un Vocabulaire français maya.*†

For the present, I offer from this work what concerns the Maya alphabet, which is the first indication we have of so valuable an addition to our knowledge of an alphabetic arrangement originating in the New World. This will be information, especially to Mr. Crawfurd, who, in his paper "On the Civilisation of Man," in *Trans. Ethno. Soc.*, 1861, says, "From Italy to Japan, many nations had invented written languages, either hieroglyphic or phonetic, but neither the inhabitants of the Andes nor any other American people had done so."

The Abbé observes as follows:—"In the winter of 1863, I copied the *Relacion de las Cosas de Yucatan*, which are in the Royal Academy of Madrid.‡ It contains the complete nomen-

* Yucatan comes from the Maya words *Ci u than*, "they said so". It was known to the natives as Ulmil Cuz, and *Etel Ceh*, or "land of the wild turkey and deer". Maya, or Mayathan, comes from *Ma-ay-ha*, "land without water". *Mayapan* means "flag or banner of the Mayas". There was a more ancient name for this region, viz., *Chacnouitan*.

† Published by Trübner and Co., London.

‡ The MSS. from which this was copied is not Landa's original one, but one made thirty years after his death. Judging by the title and certain

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clature of the signs of the Maya Calendar, which will be of great importance for the reading of the Yucatan inscriptions. Landa has the great merit of handing down to us the signs constituting the alphabet, which, although incomplete, is of great interest, as it is the first key to unravel the mysterious inscriptions of Yucatan, Palenque, Copan, etc. I have compared these characters with those of the *Codex Mexicanus*, No. 2 of the *Bib. Imp.*, and with the *Codex Amer.* of Dresden, reproduced in Lord Kingsborough's work; one and the other are written in identical characters; and I have already observed those of the calendar reproduced by Landa, as well as about a dozen phonetic signs. I have read a certain number of words, including *ahpop*, chief; *ahau*, king. The difficulty I have had, up to the present time, has been to identify the other signs; which leads me to think that they belong to a very ancient language, or to dialects different to the Maya or Quiché. I hope that photographs will soon be taken of the Yucatan inscriptions; also, that there will be discovered some Maya MSS. (books like those of the Aztecs), said by Landa to have been buried with the Maya priests.

"Diego de Landa was of the noble house of Calderon; he was born in 1524, and became a Franciscan monk in 1541. He was the first of his Order who went to Yucatan, where he laboured zealously to convert the Indians; still his zeal was not exempt from violent acts. He became second Bishop of Merida in 1573, and died 1579.

"Looking at the times when Landa lived, there may be some excuse for his burning all the Maya MSS. he could lay his hands on, for he says they were the work of the devil. Such, also, were the ideas of Zumarraga in Mexico, and Las Casas in Guatemala. Landa, however, has rendered a great service to history and science in compiling such a work as he did, and particularly in preserving to us the Maya alphabet, which we

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phrases, it is incomplete; and the copyist has suppressed the titles which divide the chapters. Pinelo, in his *Bib. Occ.*, adverts to a work the title of which is similar to that of Landa by Dr. Sanchez de Aguilar, a native of Valladolid in Yucatan. Cogulludo mentions this work as one of great historical interest.

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may look upon as a key to many of the American inscriptions; without him they would have remained an enigma probably for ever, as were the Egyptian hieroglyphics before the discovery of the Rosetta stone."

THE MAYA ALPHABET.—EXAMPLES.

e L e Lé

ha

ma i n ka ti

1.	a	10.	i	19.	p (1)
2.	a	11.	ca(?)	20.	pp (hard)
3.	a	12.	k*	21.	cu ?
4.	b	13.	l	22.	ku (guttural)
5.	b	14.	l	23.	x# dj or dz (?)
6.	c	15.	m	24.	x tch (?)
7.	t	16.	n	25.	u (2) ou (?)
8.	é	17.	o	26.	u
9.	h	18.	o	27.	z ç (3)

ADDITIONAL SIGNS.

a (variation.)		ma (me or mo.)	
h (ditto.)		ti	
h' (guttural.)		sign of aspiration ?	

* Or *ha* guttural.

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Landa's Account of the Hieroglyphic Alphabet of the Maya Language.—"The Mayas made use of certain characters, or letters, by which they wrote in their books the account of their ancient doings and their sciences, and with these and figures,* they understood those things,—they made them to be understood, and taught them. We found a great number of books of these letters, and that they should not have anything which had the superstition and the falsity of the devil in them, *we burnt them all*, at which they were surprised, indeed, and much afflicted."

By the side of these letters I will put *a*, *b*, *c*, etc., for their rudeness did not allow them our letters. They used for the sounds of their letters a character, and for the punctuation another, which was carried on *ad infinitum*, as will be seen by the example *Lé*, which means "a lazo or noose" used in hunting; to write which in their characters, although it has only two letters, they wrote it with three, adding to the sound of the *l* the vowel *e*, which is before the word,† and afterwards, at the end, they put both together.

Ha means "water", because *h*, or its sound, has *a*, *h*, they place it rather before the *a*, and at the end, as seen in the example.‡

They thus write in part, but in one and the other manner; and I would not have made mention of this subject, but that I wish to make known all about them. *Ma in Kati* means "I

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* *These notes by B. de Bourbourg.* It is to be regretted that Landa did not deem it of sufficient importance to have preserved *these signs*, with the characters.

† Landa's style is very obscure. It would seem there was a repetition of the second *Le*.

‡ See p. 318 of the *Relation*, etc. The sign ʌ found in the original after the sign *ha*; is this a sign of aspiration, sound, or a simple mark of the author's? In the MSS. said to be Mexican, No. 2 in the *Bib. Imp.*, there is often seen a similar sign of a horseshoe form; is this a sign of aspiration or sound? Following Landa, it would seem that the word *ha*, water, is written with the two forms of *h* (the guttural and the aspirate), and *a*, and the following character is simply the symbolic sign of water; which leads me to conclude that the Mayas, like the Egyptian, first gave the letter, then the figurative sign of thing to be written for greater certainty.

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do not care", which they write in parts, as seen in the example. Then there are the additional signs: as, variation of the letter *a*, No. 1; of the letter *h*; *ha* (water) or *'h* guttural; *Ma* (probably *me* or *mo*); *ti*; and the sign of aspiration (the horseshoe ?)."

NOTES ON THE ALPHABET BY B. DE BOURBOURG.

1. (19. *p*). In Landa's original MSS., the sign of the letter *P* is not in its right place, but in the margin with this sign A, which I find again between the characters *o* and *pp*. The resemblance will show that what I have taken above for the sign of aspiration (but on which subject I have still my doubts), has caused me to think it is an *o* aspirate (fig. 18), and the aspiration of the character (fig. 25). I nevertheless think it may have neither of the above meanings.

2. (25. *u*). I have not been able to make out whether this is a *u* or any other letter, the MSS. being illegible. Subsequent researches among the documents written by the aid of these characters will doubtless give the true sound, as well as those of *c*, *cu*, *Ka*, *x*, and *z*, relative to which there are some doubts.

3. (27. *z*). The reader will find in the following page several monosyllabic signs, also variations of the letter *a* (1) and of the letter *h* (9). I may mention that there is also found among several of the characters representing the days, and that these appear to offer a series of syllabic signs, or figurative, employed together in the Maya writing, independently of their signification as special characters of the days. [The same may be said of the characters representing the months.—W. B.]

4. We may observe that the Maya alphabet, according to the grammar of Pedro Beltran de Santa Maria, has twenty-two letters, of which the following ↀ (*c* reversed), *ch*, *barré du haut*, I replace by a *ch*, merely to distinguish it from *k*, *pp*, *th* (written sometimes *tt*), and *tz*, are proper to the language,

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and of a difficult pronunciation only to be learnt in the country. The *ch* not *barré* has the sound of *tch*; *h* is a guttural aspirate; *u* has the sound of *ou* in French, replaced frequently by the *w*; and the *x* the sound of *ch* in French, or *sh* in English.

At page 120 of the *Relation* is the following. The Maya alphabet has not the letters *d, f, g, q, r, s*, which they did not appear to require; but they had to double others and add others: as, *pa* means "to open", and *ppa* (pressing the lips firmly) means "to break"; *tan* is "lime" or "ashes"; and *tan*, pronounced strongly by the tongue and upper teeth, means "to speak".

EIGHTEEN MONTHS OF THE YUCATAN YEAR.

Mat of reeds, *Pop.* Frog, *Uc.* Tree, *Zip.* a Bat, *Tzos* or *Zoc.* Death's head, *Tzec.*

The end, *Xul.* Summer, *Yaxkin.* Feet, or to unite, *Mol.* A well, or pure (?) *Chen.* First, *Yax.*

White, *Zac.* Deer, *Ceh.* Lid-cover, *Mac.* Yellow Sun, *Kankin.* Strong (?) *Muan,*

Musical Instrument, *Paz.* Song, *Kayab.* Noise, Thunder, *Cumhu.*

The five days were *Kan, Chiccan, Cimi, Manik*, and *Lamat*.

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THE TWENTY DAYS OF THE YUCATAN MONTH.

Yellow,	Little(?)	To die(?)	Feast,	
Kan.	*Chicchan.*	*Cimi.*	*Manik.**	*Lamat.*

To unite,	Leg,	Tree,	Ladder,	Go,
Muluc.	*Oc.*†	*Chuen.*‡	*Ebs.*	*Ben.*§

Rust, mildew,	To build,	Wax, copal,	When (?)	Sorcery (?)
Ix.‖	*Men.*	*Cib.*	*Caban.*	*Esnab.*

	King,		Air, courage,	A plant,
Cauac.	*Ahau.*¶	*Ymix.*	*Ik.*	*Akbal.*

NOTE BY W. BOLLAERT, *from p.* 166 *of his South American Antiquities* (Trübner, London).

The Aymará language of Peru has a labial, dental, and guttural pronunciation peculiar to it. The first is designated as *pp*, being pronounced by emitting the respiration with force against the lips united, as *ppia*, a hole; *ppampaña*, to bury. The second, with *tt*, is done by the tongue being placed against the teeth, as *tthanta*, head, but which, if pronounced with force, would mean something knavish. The third, *ck* or *k* are pronounced in the throat, with this difference, that the first is more guttural, as *choka*, a tree; *kollke*, money. Here we see a common character with the Maya.

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* *Manik*, current of wind. † *Oc*, that which can be held in the hollow of the hand. ‡ *Chuen*, plank of white tree. § *Ben*, expend with economy.
‖ *Ix*, collect fruit. ¶ *Ahau*, King, or period of twenty-four years.

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It may be asked how Bishop Landa made out these symbols to be of an alphabetic character.

At first he would form a vocabulary from the sounds of words in the Maya with the Spanish, which would lead him to an explanation of the symbols representing the days, months, and years of the Maya calendar; and lastly, to the history of this aboriginal people.

Landa has preserved to us the symbols of the eighteen months of the Maya year, and the symbols representing the twenty days of the month, with their Maya names in our letters. He has also given the whole of the annual calendar, one series commencing on the 1st of January = twelfth day, *Ben*, in the eighth month, *Chen*. The other series commencing the Maya year on the twelfth day, *Kan*, in the first month, *Pop* = to 16th July.

MAYA MONTHS.		MAYA DAYS OF THE MONTH.	
1. *Pop*	Mat of reeds.	1. *Kan*	Yellow.
2. *Uc*	Frog.	2. *Chiccan*	Little.
3. *Zip*	Tree.	3. *Cimi*	To die.
4. *Tzoz*	Bat.	4. *Manik*	Feast (?)
5. *Tzec*	Death's head.	5. *Lamat*	
6. *Xul*	The end.	6. *Muluc*	To unite.
7. *Yaxkin*	Summer.	7. *Oc*	Leg.
8. *Mol*	To unite.	8. *Chuen*	Tree.
9. *Chen*	A well.	9. *Eb*	Ladder.
10. *Yax*	First.	10. *Ben*	To go.
11. *Zac*	White.	11. *Ix*	Rust, mildew.
12. *Ceh*	Deer.	12. *Men*	To build.
13. *Mac*	Lid-cover.	13. *Cib*	Wax, copal.
14. *Kankin*	Yellow Sun.	14. *Caban*	When (?)
15. *Muan*	Strong (?)	15. *Eznab*	Sorcery (?)
16. *Pax*	Musical Instrument.	16. *Cauac*	
17. *Kayab*	Long.	17. *Ahau*	King.
18. *Cumhu*	Noise, thunder.	18. *Imix*	
		19. *Ik*	Air, courage.
		20. *Akbul*	A plant.

The eighteen months were of twenty days = 360 days, to which were added five days; viz., *Kan, Chiccan, Cimi, Manik,* and *Lamat,* to make up the 365 days of the solar year.

I will give a short specimen of the Maya language:—*Lelo lai u tzolan ti Mayab Uaxab* (VIII) *Ahau,* or, "Epochs of the Maya history, beginning in the VIII Ahau," or 401 A.D.

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We have still to ascertain if, with this alphabet of the ancient Mayas, the Yucatan cartouches, and perhaps some of the Mexican picture-writing, may be satisfactorily read.*

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* *The Maya Language.*—Dr. Berendt, a German physician and naturalist, who has been for some twelve years a resident in Mexico and Central America, has recently succeeded in tracing to the possession of Mr. John Carter Brown, of Providence,—a well-known collector of choice American books,—a valuable MS. *Dictionary of the Maya Language*, as written three centuries ago. This work contains nearly 20,000 words, and was compiled by a Franciscan monk in Yucatan, between the years 1570 and 1600. It contains synonymes and examples in addition to ordinary explanations, and is being transcribed by Dr. Berendt for publication. It is hoped that the work will assist materially in the explanation of many of the remarkable hieroglyphic inscriptions found in the monuments and ruins scattered through Central America. The Maya language is still taught in the schools of Yucatan, and many books have been printed in that language. Trübner's *American and Oriental Literary Record*, No. 1, March 16, 1865.

In *Revue Amér. Orientale*, deuxième série, No. 4, 1864, there is an article by the learned Léon de Rosny on *L'écriture hiératique de l'Amérique Centrale* (with plate containing the *Alphabet hiératique*). See Trübner's *Record*, No. 5, July 10, 1865. M. de Rosny, in a note in the *Revue Amér.*, observes, that MSS. in the Maya character are very rare indeed; only two are known,—one belonging to the Bibliothèque Royale de Dresden, in a good state of preservation; the other, much deteriorated, in the Bibliothèque Impériale of Paris. See an account of these two MSS. in the 1*e Série de la Revue Américaine*, t. i, p. 35 (article with fac-simile), and *Ecritures figuratives et hiéroglyphiques des différens peuples anciens et modernes*, p. 19.

See vol. ii, p. 432-3, Stephens' *Central America, Chiapas, and Yucatan.* Stephens unfortunately failed to obtain at Uxmal, in Yucatan, a *beam of wood*, on the face of which was a line of characters carved or stamped, almost obliterated, but which he made out to be hieroglyphics, and, so far as he could understand them, similar to those of Copan and Palenque. He observes, "By what feeble light the pages of American history are written! There are at Uxmal no idols, as at Copan; not a single stuccoed figure or carved tablets, as at Palenque. Except this beam of hieroglyphics, though searching earnestly, we did not discover any one absolute point of resemblance; and the wanton *machete* of an Indian may destroy the only link that connects them together. Don Simon Peon of Uxmal, or his family, may still be in possession of this beam."

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VI.—*Observations on the People Inhabiting Spain.* By H. J. C. Beavan, F.R.G.S., F.A.S.L., Hon. Sec. A.S.L.

That once great and glorious kingdom of Spain,—the land of Gonsalo de Cordova, of Ferdinand and Isabella, of Lope de Vega, Calderon and Murillo,—has again begun to take its proper place in the interest of men of literature and science. The beauty of its landscape and mountain scenery, the fertility of its soil, the richness of its mineral resources, and even the backward state of its agriculture and national industry, have begun to strike travellers and anthropologists, and to instil into their minds a hope that the day is not far distant when Spain will appear once more as a great power, purged by many troubles and sufferings of the evils and abuses that grew up side by side with her former glory and wealth, and which at length overwhelmed her.

There is a wide field for the anthropologist in Spain, and it would, indeed, be a very difficult matter to grasp in any one paper, or in any one volume, a really good account of anthropology in that country, even if we had sufficient data for such a work, which at present we have not. Nobody, with the exception perhaps of Zamacola (*Hist. de las Naciones Bascos*), and one or two other authors, has paid much attention to the various races, and crosses of races, in Spain. These are so distinct, however, as to require for each a special history. The population of Spain, in fact, may be divided into four distinct races,—the Spaniards Proper, the Basques, the descendants of the Moors, and the Gitanos, or gypsies. The Morescoes (or descendants of the Moors) are to some extent pure; but the great majority of them have intermarried with Spaniards, producing thereby a race very much darker in feature than is usually the case in Spain, but with clear complexion and finely formed and beautiful features. These people are proud of their descent, and consider themselves

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the best blood of the country, however little real Spanish blood there may be in them. In Granada, as may be supposed, the type is especially to be seen; and I have repeatedly noticed in that city faces so dark in colour that they could hardly be taken for European, while this colour gradually alters by marriage with Spaniards proper to a lighter tint. It is no unusual thing, in Málaga especially, and other towns on the south coast, to find the two extreme classes of complexion,—the dark brown of the Moresco, and the red and white formed by a union between Spaniards and Germans. This mixture, I may add, seems to produce a very beautiful race; and those I have myself noticed as the offspring of such a union, have been remarkable for fine complexion and cheerful expression of countenance. The features, however, are not so finely made as in the pure Spaniard. The Gitanos, or gypsies, the Basques, the Gallegos, and the Biscayans, have so many peculiarities which the other parts of the nation do not possess, and speak such a very different language—hardly to be called even a *patois* of Castilian—that it would be perfectly impossible to give even a general account, or to endeavour to grasp at once, or with any certainty, the ethnography of the kingdom of Spain.

With regard to the general character of the inhabitants of the several provinces, Swinburne remarks, "The Catalonians appear to be the most active, stirring set of men, the best calculated for business, travelling, and manufactures. The Valencians are a more sullen, sedate race, better adapted to the occupation of husbandmen, less eager to change place, and of a much more timid, suspicious cast of mind than the former. The Andalucians seem to be the greatest talkers and rhodomontaders in Spain. The Castilians have a manly frankness, and less appearance of cunning and deceit. The New Castilians are, perhaps, the least industrious of the whole nation; the Old Castilians are laborious, and retain more of the ancient simplicity of manners; both are of a firm determined spirit. The Aragonese are a mixture of the Castilian and Catalonian, rather inclining to the former. The Biscayans are acute and diligent, fiery, and impatient of control, more

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resembling a colony of republicans than a province of an absolute monarchy; and the Gallicians are a plodding, painstaking race of mortals, that roam over Spain in search of a hardly earned subsistence." These latter, indeed, seem to be the "hewers of wood and drawers of water" throughout Spain, and in parts of Portugal likewise. Nearly all the porterage in Lisbon is performed by Gallegos; and on my first visit to that city, I was rather astonished to find a colony of foreigners doing the same work which the poor natives of any other city would be only too glad to do for the sake of a livelihood. These foreigners, however, differ in no respect from their brethren more than in the fact that they are industrious. The Portuguese are certainly more active than the Spaniards; and for this reason I rather wonder at the Gallegos being permitted to take so much bread, so to speak, out of native mouths; but long custom must be the only explanation. The Gallegos, in fact, are a thoroughly go-a-head set of people, and let nothing be lost for want of perseverance. In spite of this un-Spanish quality, however, they appear to remain always porters and beasts of burden. Happy and contented, they will never rise much in the social scale, nor shine in politics or literature; they do not trouble themselves with revolutions or *pronunciamentos*, but live for work and work alone.* There are several large manufactories in their province, which are carried on with care and intelligence; and in this, as well as in other branches of industry, the provinces of Cataluña, Biscaya, and Valencia stand second—Gallicia, is, however, especially pre-eminent for real plodding work.

The Basques, the ancient Vascones, deserve a rather longer account. Their nation—for in reality it is little else, so distinct is it from the rest of Spain in every possible way—is

* They are good sailors, but do not at the present day appear to care very much about the sea. As fishermen, their voyages are principally along their own dangerous coast, but a certain number of them are to be found on board the few men-of-war owned by her Most Catholic Majesty. Coruña and Ferrol, the two chief fitting-out yards for the Spanish navy, show that the Gallego's ancient love of the sea is not altogether lost; but for all that, land suits him far better than water.

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divided into three provinces, the chief of which is Biscaya. The hard-working inhabitants obtain a living in a great measure from the ironworks which have, comparatively lately, been established there; but besides this, agriculture engages a great number, especially since the country is rather bleak and barren, with the exception of the valleys, and great care and attention are required to produce good crops. The Basques still possess their own laws, customs, and privileges, and are excessively tenacious of their peculiar rights. "All the Basques are noble by right, and hold rank as such; and this fact imparts to them an air of dignity even among the lowest, and no doubt it has helped to maintain the good character they have always borne for honesty and integrity; for we know that self-respect, when not carried so far as arrogance and vanity, does much to raise a man's social and moral condition."

Zamacola, the historian of the Basque provinces, gives a very good description of the inhabitants, and appears to have been so enlightened a man as to have even had an idea of anthropology; of ethnography he was certainly not ignorant, though no doubt his researches were superficial and sometimes of little real use. He has a great idea of the peculiar characteristics of the Basques. "Their education, genius, character, laws, honesty, generosity, games, music, and dances, and the inexhaustible love of their country, continue the same as in the times of Augustus and Tiberius." The ladies, he informs us, were nearly as strong as the men, "and the prize-ring held a great place in their affections; for they often fought with the men in a regular pitched battle, and frequently were the conquerors." This being the case, we cannot be surprised that the children of such mothers are, even at the present day, active and muscular. Of the moral effect of a ladies' prize-ring, I need say nothing; no doubt it was all right in those days.

General Serviez states that the Basques are descended from the ancient Bascones [Vascones] or Cantabri, and therefore from the Iberians, the primitive inhabitants of Spain. He says, "The people have occupied a very important place in

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the annals of antiquity, and were the terror and hatred of the Romans, even when the latter were at the highest point of their power. Hannibal, who allied himself to the Basques, owed a great number of his victories to their valour and intrepidity; and when he was abandoned by them, the power of Carthage was destroyed in Spain and Africa." He likewise praises their honesty, hospitality, and industry. Bowles, who visited Biscaya in 1780, says, "Whoever seeks native simplicity, health, and real happiness, will undoubtedly find these blessing in these mountains; it is in them that he will find in general a people, if not opulent, really contented, true patriots, and not servilely submitting to the powerful. Everyone possesses something; and in general it is considered disgraceful to be a beggar."

The Basques are, as may be imagined, rather prejudiced and obstinate, and dislike severe discipline, or being governed by officials from other parts of Spain. Gonsalo de Cordova, who had many of them under him in Sicily, said "he would rather keep lions than Biscayans." I need say but a word concerning their language, the *Euskara* (or *Euskaldunac*), as they call it, which is so peculiar to themselves.* It was supposed for some time to be a dialect of the Celtic; but it would seem in reality to be a distinct language, which once was spoken all over the peninsula. This of course can be but conjecture; but there seems to be good ground for considering it to be the fact, and William von Humboldt published some curious results of his inquiries into the matter in 1821, at Berlin.† The Spaniards Proper have no knowledge whatever of the Basque language; and all those who have conversed with me on the subject seem to consider it as a completely foreign tongue. Indeed, the inhabitants of the part of Spain with which I am best ac-

* According to Max Müller, it is neither Aryan nor Semitic, and has thrown out a greater abundance of verbal forms than almost any known language.—*Lec. Sc. Lang.*, 2 ser., p. 20.

† "Even as the mother tongue of the present Welsh was originally the language of the whole of Britain, so was the mother tongue of the present Basque the language of the whole of the Spanish peninsula."—*E. B.*, v. 9, p. 351.

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quainted, the south, look upon it as a barbarous idiom, quite unworthy of any attention on the part of a Castilian or Andalucian. *La lengua Cristiana*, as they call their own language, is the only one, in their ideas, fit to be spoken,; and some old authors, I believe, declare it to be the language of the angels, although the natives of Wales and Scotland lay claim to the same honours for their euphonious tongues.

Very little is known about the ethnography of the Basques as a nation. Zamacola, however, informs us that they speak the primitive language of the earth,—the same language which was spoken by the first inhabitants of the world; or, as he cautiously remarks, if it is not the real primitive tongue, it is one of its immediate descendants. By this, and other observations, he appears to intimate his belief that the Basques have continued as they are now from the beginning of the creation of man; that they have remained unaltered in all important matters, both physical and moral, with the one exception of religion, with little or no intellectual gradation from ancient to modern times. Our old author, then, cannot be charged with having any Darwinian opinions, but may be considered to have been a firm believer in primeval Basques.

Carl Vogt says (*Lectures on Man*, p. 381), "These Basques are just the most remarkable people . . . which exist on the earth, differing in every respect from all the surrounding peoples. They possess a language, the analogue of which has only been met with in America." Dr. Broca remarks (p. 382), "The Basques much approach the African longheads; they much resemble the Negroes by the form of the cerebral skull, which in this respect deviates but little from the orthognathous African races. I must, however, add that the Basques differ from all African races, even the whitest and most orthognathous, by the smallness of their upper jaw, the slight development of the cerebellar protuberance, and the relative shrinking of the occipital protuberance. These characters equally distinguish the Basques from the European races. I conclude, hence, that in searching for the origin of the Basques out of the Basque country, their ancestors will be found neither among the Celts, nor the rest of the Indo-European

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nations, but that our investigations must be directed towards northern Africa. Europe was at a remote period, no doubt, connected with Africa; we need, therefore, not feel surprised to find affinities between the primitive inhabitants of both parts of the world, even if it were not known that many migrations had, in ancient times, taken place across the Straits of Gibraltar." Carl Vogt seems inclined to the idea of a former emigration from *America* to the Bay of Biscay, "perhaps by way of the connecting land between Florida and our own continent, which is now submerged in the sea, but which, according to all probability, was at least in the middle tertiary (miocene) period still above water"* (*Lectures on Man*, p. 383).

Laborde gives us very little information concerning the ethnography of the Basques. He merely mentions their character in general terms, and has a good deal to say about their extreme haughtiness, conceit, and pride, which is not of any importance to an anthropologist. The Abbé de Vayrac, who wrote in 1719, gives a very curious account of the Basques. Among other things, he notices that in the year 200 B.C., they sailed to Ireland in boats made of trunks of trees covered with leather, and seized on part of that country. As, however, he appears never to have visited Spain himself, his observations may be recommended as curious in many respects, but cannot be taken as authorities for Basque ethnography or character. It is a pity that old writers should have been content to accept as truth so many circumstances, which a little investigation would have disproved. In future, anthropology will doubtless make a chapter in all important works of travel, and the information we shall thereby obtain will be of the greatest possible use to students of that science.

The first aim of a Spanish historian and ethnographist, however, is the exaltation of his own country; and anybody who has ever studied the literature of Spain, must have noticed how fond the authors are of mixing up unauthoritative, nay, even puerile legends, with matters of serious import. We

* Since this was written, I find that Professor Wilson has quoted some of M. Broca's remarks on this subject in his paper on the "Physical Characteristics of the Ancient and Modern Celt," in the *Anthrop. Rev.*, No. 8, p. 59.

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must be very cautious, then, how we take the ideas of Spanish writers concerning the ethnography of their own country. They gain so much of their so-called authority from legends, that but few can be taken as giving us much reliable information on the subject. One of the best of these writers, Don Miguel Alcantara, informs us that the first invaders of Spain were chiefly composed of volunteers from Arabia, to whom were added various adventurers from Egypt, the Libanus, the plains of Jordan, of Mesopotamia, and Persia. The Egyptians, he adds, settled in Murcia, Estremadura, and Portugal; the Syrians in Ronda, and other places; the Persians in Huete; the adventurers from the Jordan, in Málaga, etc., etc.; while ten thousand cavaliers from Damascus could find no place at all in which to settle. He gives 744 A.D. as the date of these events.

We know comparatively but very little indeed concerning the languages or dialects spoken in Spain before it became a Roman province. Strabo says (lib. iii, p. 139), that various dialects were in use in his time among the inhabitants of the Peninsula, and that the Turdetani had a written code of laws in verse. "The Phœnicians and Greeks who settled in Spain," another authority informs us, "must also have introduced their own languages; whilst the Celts, who occupied the north-western districts, spoke their own tongue.* During the Roman domination, all these seem to have made room for the Latin, except in the north and north-west of the Peninsula, where the Basque was and still is generally spoken." After the invasion of Spain in the fifth century by the northern nations, who did not endeavour to introduce their own tongue, a corrupted Latin was spoken, the original purity of the same having been altered by the addition of many foreign words, or by a change in many words formerly used. Succeeding this age of corrupted Latin, came "the Arabs, whose language must at one time have been very generally spoken in the

* Bory de St. Vincent mentions these people as the "Celtic race, whose cradle was, among other places, in Spain, which probably at that time formed part of Africa" (*L'Homme*, vol. i, p. 122).

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Peninsula. Alvarus Cordubensis, a writer of the tenth century, informs us, in his *Judiculus Luminosus*, that out of one thousand Christians, scarcely one could be found capable of repeating the Latin forms of prayer; while many could express themselves in Arabic with rhetorical elegance, and even compose verses in that language. Nearly two centuries after the taking of Toledo by Alfonso the Sixth, Arabic was still spoken there in preference to the Castilian, and most legal writings, even between Christian parties, were made in Arabic. Up to the end of the thirteenth century, the kings of Aragon were in the habit of signing their names with the letters of the Arabic alphabet. On the taking of Seville by Ferdinand the Third, it was deemed necessary to translate the Gospels into Arabic, in order to instruct the Christian population of that city in the duties of religion, which, as well as their native language, they had completely forgotten during their long captivity. Of these heterogeneous materials the modern Spanish language is formed, although it would be difficult to say at what time it began to assume its present shape. Bouterwek thinks that the Castilian tongue had its origin before the Saracen invasion; whilst Dr. Puigblanch has gone so far as to assert that it was the sister of the Latin, and existed as early, at least, as the times of the Roman republic. How far the Arabic has contributed to the formation of the modern Spanish is a contested point among Spanish critics; some, like Mayans* (*Origenes de la lengua Castellana*, vol. i, p. 27), asserting that it has only borrowed a few words from the language of the conquerors; others, like Conde, pretending that the Castilian is so much indebted to the Arabic, not only in its vocabulary, but in its idioms and phrases, that it ought to be regarded as a dialect of the Arabic" (*P. Cyclo.*, vol. xxii, p. 301).

So much for the opinions of one or two learned men on the Spanish language, which, however, requires a far more careful and detailed notice than is possible to be given here. What has been said must be taken merely as a note on the subject, as the philological question would demand for itself alone a

* D. Gregorio Mayans y Siscar, who wrote in 1737.

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long and elaborate paper. The two opinions, however, which have been quoted, are most probably extreme. No person who has any acquaintance with Spanish, and more especially the Spanish of Andalucia, can doubt the existence of Arabic words in its composition. In fact, many Arabic phrases are still in use in ordinary conversation, especially in the country around Granada and Málaga. These words, however, have become almost Spanish from long use; and one in particular is to be found in the *Diccionario de la Academia*, although in reality it is pure Arabic. The old Arabic names of places and streets are retained in many towns; but this is especially the case in Granada, where everything reminds the traveller and archæologist of the past glories of the Moors. Granada, indeed, both for position, scenery, and interest, is the most exquisite place I have ever seen.

As a contrast to the industry of the Basque, we may take the Valencian. It can hardly be supposed that they inhabit the same land, so essentially different are they in everything. "The Valencian," says the Chevalier de Bourgoanne, "is the most idle and, at the same time, the most supple individual that exists. All the tumblers and mountebanks of Spain come from the kingdom of Valencia" (*T. in Spain*, iii, p. 343). This is a point, perhaps, which strikes the anthropologist most in Spain, that the number of provinces seeming to possess a separate race is so great. It is hardly the case with any other country. Many nations possess inhabitants who speak a *patois*, or half a dozen different *patois*, but they are all, as a rule, capable of being understood by one another; but such is not the case in Spain. A Castilian laughs at an Andalucian, but can understand him; but most of the other provinces cannot do so at all. The Andalucian can hardly understand the Catalonian; the Valencian cannot understand the Gallego; and neither of them can make out the Romani or the Basque.

Spain is, indeed, a most interesting and rich country for the anthropologist and the philologist; while in beauty of scenery and climate it is second to none. "Though the Spaniards are naturally men of wit and of an elevated genius, yet little progress in the sciences is to be expected from them while the

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clergy use their utmost efforts to keep them in ignorance, branding all literary researches with the name of heresy, and inveighing against the seats of the Muses as the schools of hell, where the devil teaches sorcery." Although this sweeping condemnation of science has altered for the better, it is even now a well-known fact among travellers that the Spanish clergy oppose education, and consequently science, with all their might; and of course this opposition was much more powerful and serious when the country was overrun with monks and friars. The ignorance of the Spanish clergy at the present day may have much to do with their dislike of learning, for it would never be fitting that the parishioners should be more accomplished and better educated than their priest and spiritual adviser. As it is, however, the people have that idea of the priesthood, that no person of respectability will allow his son to enter the religious colleges to prepare for orders, unless poverty compels him to do so. This is much to be deplored; and we may reasonably hope for better days in the future, whenever Spanish self-sufficiency is exchanged for useful and earnest reform. It is almost certain that improvement is desired, and there is a sufficiency of both colleges and schools; but the fault seems to lie chiefly with the teachers, who know very little, and are jealous of anybody being better educated than themselves. The present generation, however, which is feebly commencing the good work, will find to its sorrow that it would have been far better had the notion, that ignorance keeps a people quiet, been examined into a little more carefully years ago, and its fallacy proved.

We have full evidence, however, that in the times of the Moors learning and art were properly appreciated, and both literature and science were cultivated in the golden age of the Arabs with great success. In the reign of Abdalrahman we find, according to M. Peyron, who is quoted by the Chevalier de Bourgoanne, in his *Travels in Spain*,* that science was as much esteemed as in our own times, and that poetry was at the summit of its glory. "The poet," he says, "in this

* *Essai sur l'Espagne*, par Peyron, vol. iii, p. 28, 1789.

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climate, in which pleasure and imagination jointly reigned, shared in the veneration which the public had for his works; the number of academies and universities increased in Cordova and Granada; even women gave public lectures on poetry and philosophy; and literary resources abounded in proportion to the progress of science. I recollect to have read that at that time there were seventy public libraries in Spain." Some years ago there were only sixteen remaining, and I do not imagine many have been established of late years.*

One of the great desiderata to the student of anthropology in Spain is a good collection of Spanish skulls. I am sure that, with care and attention, a most interesting and valuable collection might be obtained, which would fully repay any trouble which might be taken in getting them sent to this country. From all accounts they vary more than in most kingdoms, and even the superficial observer will notice their peculiarities in the course of a residence in Spain. In the Asturias, for instance, the inhabitants had a curious habit of flattening the back of a child's head as soon as it was born. How this was done we know not, for M. de Laborde, who mentions the fact,† does not explain the process; but very probably it was effected in the same manner as is usual among

* With regard to M. Peyron's mention of the strong-minded women who taught poetry and philosophy, I may remark that we find an equal amount of learning among such ladies in the reign of Philip II: "Isabella de Joya attracted universal admiration at Rome, during the pontificate of Paul III, by the easy and ingenious solutions which she gave in the presence of the Cardinals of some of the most subtle questions in the works of Scotus. At the same time Louisa Sigé, born at Toledo, but of French extraction, was able to converse in Latin, Greek, Hebrew, Arabic, and Syriac; she also wrote a letter in the above five languages to the Pope, Paul III. Juana Morella, a native of Barcelona, but educated in France, sustained at Lyons, in 1607 (being then twelve years old), public theses in philosophy; at the age of seventeen, she repeated this public exhibition in the college of the Jesuits; she was equally learned in philosophy, theology, law, and music, and conversed in fourteen languages."—M. de Laborde, *Itinéraire desc. de l'Espagne*, vol. vi, p. 160. Several other instances are mentioned which are hardly worth repeating here.

† *Itinéraire descriptif de l'Espagne*, vol. vi, p. 463, 1830.

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some North American tribes, who likewise are accustomed to distort the heads of their newly-born infants. If any skulls had been obtained from the Asturias,—and I do not know whether there are any to be found either in public or private collections,—this fact would, no doubt, have given rise to many theories of race and cranial formation, unless the custom above mentioned were known to anthropologists. Laborde mentions it as having been usual in his time, but I cannot say whether it is so at the present day. I have communicated with some friends of mine in Spain with the view of obtaining some specimens of Asturian and Basque skulls, but I find that at present the difficulty of doing so is so great, that I fear we shall have to wait some time before our museum can boast of any reliable specimens. However, the Anthropological Society lately established at Madrid, to which, I am sure, we all wish every prosperity and success, may possibly be able to assist us in this matter.

In concluding these few remarks, I must express a hope that ere long we may have some really useful and reliable information concerning anthropology in Spain. The field is a new one; it is rich in many ways; and I think with time and attention that a large number of facts may be obtained which will be of service to our society, in the prosecution of its studies of the science of man.

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VII.—*Remarks on Genealogy in connexion with Anthropology.*

By George W. Marshall, LL.M., F.A.S.L.

Genealogy, or the tracing of the descent of individuals, and through them of nations, from some common progenitor, is a subject of vital importance to a society which includes among its various objects that of investigating the laws of man's origin and progress. I have, therefore, no apology to offer for the very cursory observations I am about to make concerning the means it affords us of becoming better acquainted with the history of mankind, and with the origin of different nations. I desire that my remarks may be considered as merely suggestive of some of the ways in which the study of the pedigrees of individual families can be made practically useful to the student of anthropology. It is not my intention to offer facts drawn from the history of any particular family; all I shall attempt to do is to call your attention to the kind of facts to be gleaned from the labours of the genealogist.

Here I should observe, that a taste for genealogy is a passion inherent in the whole human race. In all nations, civilised and uncivilised, in all times, ancient as well as modern, we find mankind carefully preserving the names and relationship of those from whom they claim descent. How does this taste arise? I should say that it is owing to such circumstances as in the early stages of society render one man capable of obtaining better food and more suitable clothing than another, or to the chances which have placed him in a climate better adapted to his constitution; hence, as civilisation extends, he becomes physically less coarsely made, and eventually more intellectually developed; from these things combined, his descendants become a race more refined, both bodily and mentally, than those who have in the mean time been going on labouring for their daily bread, or struggling for existence against adverse circumstances. Some few generations of refined ances-

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tors become, therefore, a sort of guarantee that those who can show them are to a certain extent superior to those who cannot. From the desire to prove and assert this superiority comes the very natural love of genealogy.

It is admitted that ethnology is an important part of anthropology; and are not ethnology and genealogy essentially the same? Have not the ethnologist and genealogist the same object in view? If they differ, is it not only in this, that the ethnologist studies man by grouping him into different large races; whilst the genealogist seeks to know him more completely by studying him in individual families? The genealogist is, in fact, the architect who builds up the structure of the science of man, stone upon stone, and story upon story. He is the author who compiles the history of man, of which the ethnologist, like a reviewer, presents to the public a general sketch of the contents.

Genealogy assists us to view man in his two great aspects, physical and intellectual. These seem to be so dependent upon each other, that I do not see how we can study man in one without at the same time regarding him in the other. A better knowledge of the genealogy of individual families would do much to settle the question as to whether the intellectual development of man is the result of physical refinement. Some people will tell you that there have been many talented men who have had no pedigrees, and conclude from this that the refinement of the body has therefore no necessary influence on the intellect. I must here state that, when I speak of a man "having a pedigree," I mean to say that some two or three generations at least of his fathers have been in better circumstances than the generality of their fellow men. I do not wish to argue that the longest line of refined ancestors will necessarily produce the most refined descendant. This most important question as to how far an individual is influenced by the condition in life, or educational training of his ancestors, is one which, if it can be solved at all, can be solved by the genealogist, and by him alone. If we assume, as some have done, that God has created all men equal, that one man is as capable of high mental cultivation as another, we must then

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admit that all deductions from the history of our ancestors are useless, and that the study of genealogies is a mere waste of time; but if one man *is* so constituted that he is capable of higher cultivation than his fellows, of which I can conceive no reasonable doubt, then by finding out what manner of men his ancestors were, we may be enabled in some measure to discover what modes of life and what kind of alliances will best develope the perfect man. Again, it is from a study of genealogy that we shall see most clearly the result of consanguineous marriages. Those who argue that such marriages produce, or do not produce insanity, and base their conclusions on statistics of certain matches, personally or otherwise known to them, can agree in no definite conclusion. Suppose that the history of several families, who for generations had been in the habit of contracting consanguineous alliances, was investigated, would not the descendants of such connexion be much better types of the result of consanguinity than the offspring of one consanguineous marriage only? And are not all of us the offspring of persons more or less nearly related? If we are *not*, look at the result, which at first sight appears almost incredible. I quote from Mr. Lower's *Contributions to Literature*, p. 211:—

"The following considerations will serve to show how wonderfully men and families are knit together by the ties of blood. When one reflects that his ancestry doubles in every ascent, or to speak more correctly, increases in a twofold geometrical progression, he will easily see this. Thus, as everybody has one father, two grandfathers, four great-grandfathers, eight great-grandfathers, and so on (the case being, of course, the same on the female side), if we go back to the time of King John, which (allowing three generations to a century) would be about nineteen generations, we shall find that in the space of little more than six centuries every one of us can boast of the astounding number of five hundred and twenty-four thousand two hundred and eighty-eight ancestors; that is to say, that the blood of more than half a million of the human race flows in our veins. . . . . At the fortieth remove, a period extending over about sixteen or seventeen

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hundred years, the total number of a man's progenitors amounts to more than a *million millions!*"

A study of family genealogy would show many curious particulars of human hybridity. We have only to look at the faces which meet us every day in the street to see the features of the four dominant classes which in turn governed England, still strongly marked in the appearance of their descendants, though now united into one people, with the same general characteristics. How often do we talk of family likeness, and yet how little do we know or care about its causes. We speak of certain peculiarities "running in families," as the colour of the hair, the size of the hands, tallness or shortness, big noses or little noses, or gout, or scrofula, but how these differences are caused we are almost always unable to explain. That they do exist, and do descend from one generation to another is a fact which I do not suppose anyone is bold enough, or rather foolish enough, to deny. We see the same in the brute creation. We preserve the pedigrees of our racehorses; for it is only by careful breeding, and more or less freedom from toil, that they become superior to the carthorse. The Roman poet not only recognised family characteristics in man, but speaks of them as common to the brutes:—

> Fortes creantur fortibus, et bonis:
> Est in juvencis, est in equis patrum
> Virtus:—*

But the problem for us to solve is how these differences arise, and what changes they work in successive generations. And this, so far as human reason will permit us to find out, is to be ascertained through the labours of the genealogist. To see the peculiarities of different families is easy; but in order to learn how they acquired those peculiarities, we must endeavour to ascertain their common progenitors. I am quite aware that it is impossible to substantiate any pedigree by legal proof for more than a few hundred years; yet, perhaps, more might be learnt from one such a descent than from studying the general appearance of many persons whose relationship cannot be ascertained.

* Horace, lib. iv, ode 4.

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On the one hand, our information is certain and definite; on the other, we can only judge from probabilities. The advantage of genealogy is that it *is* certain and definite, it is only when facts fail us that we should have recourse to probability or tradition. It is fact that gives rise to probability, and invests tradition with the character of truth.

Great importance has been attached to, and great use made of, the returns of births, deaths, marriages, and population; it is from them we learn the average duration of life; but our conclusions only approximate towards truth. Would not a more extended knowledge of family genealogies aid us in making a still nearer approximation? To trace the descent of any family which has not held land, is now very difficult, and frequently impossible; but with our present system of registration such difficulties annually diminish, and I apprehend that, in two or three hundred years to come, our successors will be able to ascertain their pedigrees with comparatively little difficulty. It may reasonably be said, what good will a bare pedigree do the anthropologist? I answer, none. But if the ages, causes of death, circumstances of life, etc., of the persons recorded are ascertainable, which to a certain extent they will be, then I answer, that such descents will be of the greatest use to the student of man.

Genealogy helps us to investigate the laws relating to our physical nature,—to find out why one race deteriorates while another flourishes. We were told by our President in his introductory address, that "there is no science which is destined to confer more practical good on humanity at large, than the one which specially investigates the laws relating to our physical nature." In this investigation we cannot do without genealogy. I have endeavoured very briefly to point out its value to the anthropologist. If I have shown that it is not so dry and unprofitable a study as is generally thought, I have fully attained my object. I believe that the greatest benefit to be derived from the study of genealogy, or more properly speaking, family history, is the moral and not the scientific one,—the art of learning, not how we came to live, but how we ought to live. As far as genealogy is connected with

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anthropology, I should define it as "the science of investigating the causes which lead to the intellectual and physical development of man, or contribute to his decline, so far as he is influenced by the condition of his progenitors." Viewed in this light, it seems to me to be a study of great importance to the anthropologist.

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VIII.—*On Certain "Simious" Skulls, with especial reference to a Skull from Louth, in Ireland.* By C. Carter Blake, F.A.S.L., F.G.S., Curator, Librarian, and Assistant-Secretary of the Anthropological Society of London, and Foreign Associate of the Anthropological Societies of Paris and Spain.

The skull now exhibited is the property of the Anthropological Society of London. It was presented to their museum by Capt. Montgomery Moore, who obtained it from Louth Abbey, in Ireland. Nothing more is known of its history.

The attention which has been drawn, during the last few years, to the celebrated skull from the Neanderthal in Germany, has rendered any skull which at all resembles it, in its most striking aspects, of peculiar interest. I need scarcely recapitulate what the distinctive characters of the Neanderthal skull were said to be, as its ponderous brow-ridges, and the peculiar character afforded by its sutures, are familiar to all who have read Dr. Barnard Davis's excellent paper on it.*

It was, I believe, left to M. Pruner-Bey† to be the first who pointed out the close resemblance between the skull from the Neanderthal and those of existing Irishmen. The arguments brought forward by him are so fresh in our memory that I need only refer to them here. Prof. William King,‡ of Galway, in his comparison of the Neanderthal skull with the more normal examples of human crania, refers frequently to a skull from Corcomroo Abbey, county Clare, Ireland, which, from his description, appears to present some points of affinity with the skull from Louth now exhibited.

I have said that M. Pruner-Bey, in his arguments for the Celtic character of the Neanderthal skull, rests much of his case on the extreme proportions of dolichocephaly exhibited by it (*Cran. Index*, 72). This dolichocephaly he considers to

* *Memoirs of the Anthropological Society of London*, vol. i, p. 281.

† *Journal of the Anthropological Society of London*, vol. ii, p. cli.

‡ *Quarterly Journal of Science*, January 1864.

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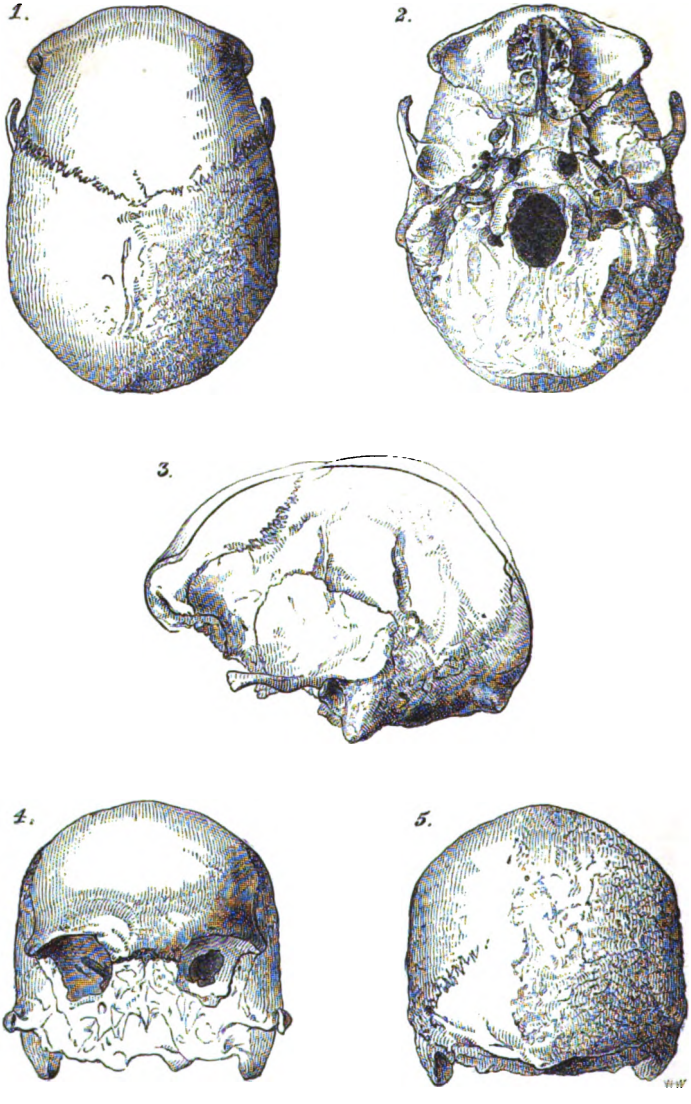

THE LOUTH SKULL.

The dark line in Fig. 3 shows the contour of the "Neanderthal" Skull.

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be an exaggeration of the Celtic characters; in fact, adopting the opinion which Retzius has so widely circulated, that the early Celts were a long-headed (dolichocephalic) race, in opposition to the short-headed prehistoric population of "Turanian" affinity who inhabited western Europe, prior to the arrival of the Celts, and whose modified descendants were supposed to be identifiable with the Basques, Laplanders, Rhœtians, etc. This theory of course rests on its own basis. It has been recently so severely criticised and ably defended in Paris, that it will here be merely necessary to call our attention to the fact that a certain long-headed type of skull is conventionally associated in our minds with the idea of the "Celt." We are, of course, aware that many early Briton (undoubtedly ancient) remains (*e. g.* those described by Dr. B. Davis from "Celtic" burial places in Northumberland) exhibit a short-headed form* of skull; we are far from denying that the true typical Celt—in England at least—may be brachycephalic; but the confusion which has arisen on this subject appears rather to rest upon the supposition that one uniform race of men overspread western Europe prior to the great Teutonic, Sclavonic, and Roman migrations. So far as regards France, M. Paul Broca has overturned this theory. He has shown that widely distinct races of men inhabited France at the earliest period; the researches of Dr. Thurnam *On the Principal Forms of Gaulish and British Skulls*,† appear to lead to a similar result. Under these circumstances, we may be content to admit the fact that in Ireland we have an extremely ancient dolichocephalic form of skull; in England, an extremely ancient brachycephalic form; in both countries, other and discordant types are to be discovered in river-beds of the highest antiquity; turning eastward, the most ancient caves of Belgium appear to afford us another and distinct long-headed type; whilst the Danish tumuli present to us a form which, although brachycephalic, differs most entirely from the brachycephaly of such ancient English skulls as those from Gristhorpe or Codford.‡

* *Trans. Berwickshire Nat. Field Club*, p. 412.

† *Memoirs of the Anthropological Society of London*, vol. i, pp. 120, 459.

‡ Thurnam, *loc. cit.*

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Any of the above types of skull may be considered by an observer as "Celtic"; and should this word hereafter be proved to have any meaning, which may be reasonably doubted, anyone will be at liberty to select that skull which he chooses to represent the typical Celt. I shall, therefore, not again employ the word "Celt" in this paper, but merely apply the words "ancient Irish" to denote such skulls, *e. g.* as are to be found at Louth or Corcomroo. The so-called "river-bed" skulls of Borris and Blackwater will be excluded from the category, and future observers must find their true place.

In commencing the description of the Louth skull, I would remark that it is ovately dolichocephalic. The browridges are large, and the points of muscular attachment are well marked. I shall, however, depart from the usual course in description, by passing at once to the characters presented by the sutures of the skull.

Condition of the Sutures.—The *frontal* suture has been early obliterated. No trace whatever exists.

The length of the *sagittal* suture is 11·4 centimetres. Throughout the whole of the posterior two-thirds of its length, obliteration has proceeded to such an extent as entirely to obscure the indications which would have shown its proportions, direction, or serration. The anterior third of the suture shows, however, slight traces of the suture, afforded by at least one wavy sinuosity, by which it is clear that this part, at least, of the suture was marked during early life by deep re-entering processes from either parietal bone. The posterior end of the sagittal suture is not at first sight easily recognisable. It is, however, discernible by the fact that the mineralising process, which has obliterated the greatest part of the lambdoid suture, has fortunately left a slight space untouched where the lambdoid and sagittal have united. The preservation of this spot is of the greatest importance. Firstly, its presence enables the observer to measure correctly the true length of the sagittal suture; secondly, it permits him to estimate the relative height of that part of the supraoccipital bone which intervenes between the inion and the highest part of the lambdoidal suture. This second point, we shall see, is

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of the greatest importance when we investigate into the form of the occiput in this skull, and compare it with such a one, for example, as that from Neanderthal.

The lambdoidal suture is present on each side, in an upward direction, for about two inches from its junction with the *additamentum mastoidalis*. On the left side, close to this junction, a complex wormian bone intervenes, forming a well-defined "eyot" in the upward track of the suture. At least twenty-one serrations can be counted on the left side, and (probably) more than eight on the right. The reason for this difference can be easily explained. The skull has lain so long on the right side that the mineralising process has more easily obliterated traces of the dextral suture. It is deeply to be regretted that this cause has led to the fact that the whole upper part of the lambdoid is not easily recognisable. While pointing out the existence of the spot above alluded to, which shows the junction of the lambdoid and sagittal sutures, there are some slight indications which lead me to think it very probable that a small triquetral wormian bone cut off the superior corner of the supraoccipital. This conjecture is borne out by examination of the bony structure under a strong lens; but I wish it to be understood that it is merely as a conjecture that I offer it. Howbeit, this fact cannot in any way affect the absolute length of the sagittal suture.

The coronal suture offers some points of interest. Commencing on the right side, immediately above the postorbital ridges, many and deep serrations exist which render the suture exceedingly complex, and which extend for more than an inch upwards towards the vertex: above this complexity the coronal suture on the right side has, no doubt, since death, been obliterated almost entirely. At the vertex, the precise spot of its junction with the sagittal requires the use of the lens for its detection. But on the left side, where no artificial causes exist to exaggerate the characters of the suture, its shape is more easily discernible. Partial obliteration has extended throughout the whole of its course, excepting the portion so deeply serrated above the postorbital and temporal ridges.

The condition of the sutures around the alisphenoid bone

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demands our special attention. It is only necessary to say that on the left side the spheno-frontal and spheno-parietal sutures are entirely closed, whilst not the slightest trace exists of their direction. It is just within the scope of probability that a wormian bone cut off the end of the posterior lateral ala, as the bone seems to show some trace of division; but this speculation rests merely on the vaguest conjecture. The squamosal bone overlaps the alisphenoid, as is normal.

Turning, however, to the right side, the shape of the posterior edge of the alisphenoid becomes manifest. A long narrow tongue of bone extends in front of the squamosal, and is partially confluent with the parietal, especially at the extreme anterior corner of the latter. It has also become, to a less extent, though still definitely, coalescent with the frontal bone. This coalescence is especially interesting, as, although upon the right side of the skull, it has taken place upon a spot apparently free from the erosive action which has taken place on the posterior right portion of the skull. In fact, the answer to any critic who might say that the conditions which I have attributed to synostosis are due to the eroded character of the skull, is afforded by the fact that the greatest evidence of synostosis is on the left, the greatest evidence of erosion on the right side of the skull. Where synostosis most prevails, erosion is absent, and *vice versâ*.

It is only necessary to say that, with respect to the squamous suture, no peculiarities meet the eye of the observer. The connexion between the mastoid and squamosal bones is obliterated to a great extent, but not more so than is usually observable in aged individuals.

I now turn to the other characters of the skull.

The browridges are exceedingly peculiar. Enormous frontal sinuses have developed a bony bridge, which extends above the eyes throughout the whole length of the supraciliaries, and is thickest and most pronounced immediately below the glabella. The supraorbital canal on the right side is higher than on the left. Proportionately to the size of the ridge, the supranasal notch does not appear deep.

The forehead is rather low and retrocedent, apparently ren-

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dered more so by the great size of the supraciliary ridges. The curve of the frontal bone, backwards and upwards, is equable and smooth. When a line from the glabella to the inion is made horizontal, the greatest height of the skull is situated about an inch behind the junction of the sagittal and coronal sutures. When the Abbé Frère's line from the *meatus auditorius* to the centre of the coronal suture is made vertical, the most posterior part of the skull is situated about one inch and a half lower than the apex of the lambdoid suture, and the same distance above the inion. The line of greatest breadth of the skull will be found in a line drawn from the spot of greatest height to the apex of the mastoid process. The parietal bones are very slightly flattened between the line of the sagittal and the line of attachment of the temporal muscle. The traces of the latter are not remarkably prominent.

Below the superior semicircular line of the occipital bone, which is exceedingly large and well defined, the occiput shelves gradually down to the foramen magnum. Although this portion of the surface shows well-defined marks of attachment for the *recti capiti antici* muscles, yet there is no trace of a par-occipital process. The mastoids are rather large; but the digastric fossa is not proportionally so deep as might have been expected. The postcondyloid foramen on the left side, although it has been broken, has evidently been large. The base of the skull, as well as the maxilla, does not otherwise present any points of interest. It is much to be regretted that the lower jaw is absent.

From the above description of the skull, I consider that the following conclusions can safely be drawn.

The contracted forehead is due to the premature closing of the sutures surrounding the alisphenoid bone, and the lower medial part of the coronal suture. In early life, the frontal and alisphenoid bones being firmly united with the adjacent ones in such a way as to form a bony plate, the same conditions were observed as were described by Dr. B. Davis, in his paper on the Neanderthal skull.

"It will thus be seen that there is nothing either of a simious character, or that might not have been expected in

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the low forehead of the Neanderthal skull, in which the brain had to grow and expand under a plate of bone, which appears to have been in a great degree in one solid piece. It was impossible to raise this plate of bone upwards; and the result, as will be seen, was a development to another direction. In the middle region of the calvaria, the sagittal suture being closed, the contained cerebral substance could only expand at the sides, in the situation of the squamous sutures; and here the Neanderthal calvarium seems not to lack development. But in the posterior region its greatest expansion took place, precisely because in this part was the open lambdoid suture, which admitted of the growth of the brain. In the figures of this imperfect calvarium, the superior occipital scale is seen to be bulged out, and the whole of what remains of the occipital bone is full and large,—the compensatory result for the contracted anterior regions."*

The above words, which Dr. B. Davis applies to the Neanderthal skull, can be applied, *mutatis mutandis*, to the skull from Louth.

The peculiarities which were alleged to be so specially characteristic of the Neanderthal skull, having been proved to be due merely to the premature closing of certain sutures, the fact is not remarkable that such skulls as the specimen, "1029 of Davis," or as the skull before us, should be encountered not unfrequently. Attention having been drawn to the influence which premature closing of the sutures produces on the form of the skull, it is probable that we shall find many other instances. But the occasional occurrence of such cases leads an anthropologist deeply to regret that such an abnormity as the Neanderthal skull, should have ever been put forward as an important link in the series of early forms, connecting man with the lower animals, and to hope that a similar error of hasty generalisation will not occur again in our science. Although to allude to the Neanderthal skull, in the present state of the controversy, may appear to some a superfluous digres-

* *Memoirs*, vol. i, p. 287.

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sion, the lesson cannot be too often insisted on, that in examining a skull purporting to be that of "the missing link", it should have been worth while to have inquired whether its peculiarities were not in some degree traceable to the premature ossification of the sutures of the skull.

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IX.—*Description of a New Goniometer.* By Dr. Paul Broca, Sécrétaire Générale à la Société d'Anthropologie de Paris, Hon. Fellow of the Anthropological Society of London.

(Translation.)

TO THE PRESIDENT OF THE ANTHROPOLOGICAL SOCIETY OF LONDON.

Mr. President,—I beg you to offer in my name, to the Anthropological Society of London, an instrument which I have had made to measure, on the living subject as well as on the skull, the facial angle and the facial triangle.

This goniometer is nothing else than Prof. Busk's craniometer, to which I have added a goniometric apparatus, composed of a quadrant, of an ascending rod, and of a transverse exploring rod. It has been described in the second fascicule of vol. ii of the *Memoirs of the Anthropological Society of Paris*, pp. 95-97.

The points of measurement used to determine the facial line have been much discussed. The lower point of measurement has been successively placed on the nasal spine, on the lower border of the alveolar arch, and on the lower border of the incisor teeth. The upper point has been placed by some on the most projecting part of the glabella, and by others just above the glabella, and by others at a spot three centimeters higher still. It results from this that, according to the system which has been adopted, the length and the inclination of the facial line vary considerably. My goniometer can be applied indifferently on any of these points of measurement, so that each observer may employ it to measure the facial angle and the facial line, according to the system which he prefers. But you will, perhaps, permit me to seize this occasion to express my opinion on the choice of the measuring points of the facial line.

When the facial angle is measured, it is possible either to estimate, or to record by numbers, the differences which exist

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between two individuals or between two races; and to determine one of the principal elements of the anatomy and morphology of the face, considered in its relations with the cerebral region.

1. In the first case, those points of measurement which give to the facial angle the greatest variations are sought for; *e. g.* the summit of this angle is placed on the free border of the incisor teeth, and the facial line abuts on the centre of the space between the two frontal eminences; and the several characters of inferiority, *i. e.* the retrocedent forehead, the obliquity of the facial bones, the length and the obliquity of the alveolar arch and of the incisor teeth, unite to lessen the facial angle, which, on the other hand, increases rapidly when the inverse conditions are present. We can thus obtain, between certain European skulls and certain Australian or Negro skulls, differences of more than twenty degrees. But the facial angle, thus measured, depends on numerous dispositions, of which the importance is very unequal; of characters of the highest value, and of characters which are entirely secondary, which are found so combined together that such an insignificant fact as the length of the teeth is able to vary the facial angle of two individuals whose facial and other conformations may be identical. Limited prognathism of the alveolar arch, as we observe often amongst ourselves, where it frequently coincides with a fine frontal development, can lower the facial angle by several degrees, and can exercise more influence on the enlargement of this angle than even a notable atrophy of the frontal region could produce. Finally; it is sufficient to have examined a collection of skulls of the same race to learn that the height of the alveolar arch can vary more than a centimeter, without any change in the conformation of the rest of the head being therewith associated; and it can even occur that, by reason of this trifling variation, an individual gifted with a noble and vast forehead may give a facial angle inferior to that of another in which the forehead is smaller and more oblique, but of which the alveolar arcade is not so high. The facial angle, thus determined, presents very great differences, of which the morphological signification may

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be very deceptive, and it is because most modern authors have adopted this process that the value of the facial angle, as an anthropological character, has been placed in doubt.

2. When, on the other hand, it is proposed to use the facial angle as one of the indices of development of the anterior cranial region, and the teeth and the alveolar should be considered apart, as their variations have no direct relation with the study of the cerebral cranium, we limit ourselves to the examination of the anterior skull, and the four facial cavities which cover it; *i. e.*, the two orbits and the two nasal fossæ. The summit of the facial angle is then placed on the inferior nasal spine, and the facial line from this point ought to be in contact at the base of the forehead, at the middle of the horizontal line which indicates the separation of the skull and the face, *i. e.*, on the middle of the line which corresponds to the lower face of the anterior extremity of the brain. If a thread is applied transversely above the supraciliary arches in such a way that the thread passes from each side immediately above the external orbital processes, a fixed line is obtained which corresponds to the minimum frontal diameter. In no individual is the brain so large as entirely to cover the face; the orbit of each side always bars its outward process, and it thus results that the frontal crest, arriving on a level with the orbit, is curved, and prolonged outwardly to constitute the external orbital process. The point where it curves, and where instead of converging it diverges, indicates the demarcation of the cranial from the cerebral region, and of the latter from the region of the face. The line which unites this point with the corresponding one on the other side, corresponds, then, to the minimum degree of separation between the two frontal crests, that is to say, to the minimum frontal diameter; it leaves above the whole cerebral region and beneath the two orbital arches, of which the height is very variable, and on the medial line it generally passes to the upper part of the glabella. But we know how variable the situation of the glabella is; the projection which it forms, sometimes almost nothing sometimes very considerable, depends in a great degree on the development of the frontal sinuses; it sometimes ascends higher,

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stops lower than the line of separation between the cranium and the face. There are then some inconveniences in the use of the glabella to determine the upper point of measurement of the facial line; and it appears to me much preferable to take the points of measurement on the middle of the horizontal line which I have indicated, and which should be deemed the supra-orbital line. The median point, thus ascertained, is the supranasal point. On the living, the point which comes nearest to it is one taken on the middle of a line tangent to the upper border of the two eyebrows. The facial line which passes by the supranasal point, and by the nasal spine, or subnasal point, presents individual and racial variations much less prominent than the other facial line which is in contact with the alveoli and with the teeth; but it has an anatomico-physiological signification much more important, because it serves to determine a simple fact, *i. e.*, the relative development of the anterior cerebral vertebra and of the oculo-nasal, which is immediately subjacent to it. It permits to measure that which is wanting in the brain, in its antero-posterior aspect, to cover the purely sensitive organs. If a plane is passed from the nasal spine to the two auditory canals, the plane divides the facial region into two parts,—the lower to taste, which is, after feeling, the least special of the sensorial functions, because the sense of taste is confided to two nerves,* entirely distinct in their origin, their connexions, and their distribution, which are subservient at the same time to general sensibility, which does not differ at all from that of the ordinary nerves. Taste is accordingly the least special of the cephalic senses; and even if it were much less special, it would only give us a small number of indications if it were not always directed by the sense of smell, of which it is, in a certain sense, merely the vassal. Nobody, in fact, will forget that a simple coryza can entirely disarrange the taste, and annihilate the majority of gustatory sensations. The real organs of special sense are characterised by nerves as much

* The lingual nerve, a branch of the inferior maxillary branch of the trigeminal nerve and the glossopharyngean nerve.

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special as regards their anatomical as in their physiological characters, by nerves which bear no relation to general sensibility, and which can only transmit to the nervous centre one kind of impression, and which transmit by one impression all the traumatic, electrical, chemical, and physical actions which they can receive. These organs are those of hearing, sight, and smell, and all are in such immediate relations with the brain that the walls of the cavities which contain them form an integral part of the *basis cranii*. These three organs of the superior senses, regarded in the period of their first formation, are only annexes of the encephalon; the external ear proceeds from the posterior cerebral cavity; the eye is merely a diverticular of the anterior cerebral cell; and the olfactory nerve can only be considered as a vesicular prolongation of this very anterior cell. Directly associated with the development of the brain, and contained in cavities which are merely annexes of the *basis cranii*, the organs of hearing, sight, and smell form a perfectly natural group, which descends forwardly as far as the nasal spine, as the partition between the nasal fossæ depends on the ethmoid which belongs to the skull. This group of the higher senses forms the higher part of the face; it is comprised entirely between the base of the skull and the horizontal plane which passes from the nasal spine to the two auditory canals. Below the nasal spine, the whole of the face, flesh, or bone belongs to the system of the branchial arches; above it, on the contrary, the branchial arches only furnish accessory portions, such as the eyebrows, the cheek-bones, the ascending branches of the maxillary, the external ear, etc.; whilst the axis of the skeleton, the ethmoid cornets, the orbital vaults, the petrosals, the labyrinths, the eyeballs, the olfactory nerves, and, in one word, the essential parts, soft or hard, proceeding directly either from the skull or from the brain.

It is this upper portion of the face, of which the relations with the anterior skull ought to be determined. In the most elevated ideal type, it will be entirely covered by the skull, and thus the facial line, drawn from the supranasal point to the nasal spine, will be vertical, but in the normal conditions

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this ideal type is never realised; the facial line is always more or less oblique, and the angle which it forms with the auricular subnasal plane is more or less lower than the right angle. The measurement of this facial angle gives us, then, important information on the relative width of the cranial region anterior to the oculo-nasal region. But this information is not exact, because the size of the facial angle depends on many variable conditions. It can, perhaps, be increased by the diminution of the face, or by the enlargement of the skull, or even by these two conditions reunited. It is not sufficient, then, to measure the facial angle; it is necessary to determine and to analyse the anatomical circumstances which it denotes. It is this object which is arrived at in the study of the facial triangle.

The facial triangle comprises the facial angle in the vertical plane in the middle of the head, has for its anterior summits the two extremities of the facial line, that is to say, the supranasal point and the subnasal point; and for a posterior summit the centre of the transverse, or horizontal line, which passes by the centre of the two auditory canals. This line is called the biauricular axis, and its median point is the auricular point. But it is impossible or nearly so, even on a section of the head, to determine exactly the position of the auricular point; and the two learned men (Cuvier and Étienne Geoffroy St. Hilaire) who were the first to study the facial triangle, were only able to do so by means of a very complicated geometrical process, which necessitated the construction of two auxiliary triangles. This is the way they proceeded. They commenced by measuring directly, with a compass, the length of the facial line A B, *the first side of the facial triangle.*

The second side, A O, or the base of the facial triangle, can be considered as the height of an isosceles triangle, C A C', of which the base is the biauricular axis, C C', and of which the summit is the subnasal point, A. But the breadth of the biauricular axis, C C', can be measured directly with compasses. With the same compasses we can easily measure the distance from the subnasal point, A, to the centre of the meatus auditorius externus, C. This is the line A C = A C'. We learn, there-

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fore the three sides of the isosceles triangle, C A C'. This triangle can be constructed on paper. From the summit, A, we can drop on the centre of the base, C C', the perpendicular, A O, and by measuring on this geometrical figure the length, A O, *the second side of the facial triangle* is obtained.

The third side, B O, can in its turn be considered as the height of a second isosceles triangle, C B C', which has, like the foregoing, the biauricular axis, C C', as a base, and the supranasal point, B, as its apex. The biauricular axis, C C', being thus measured, it is only necessary to measure with compasses the breadth of the distance, B C=B C, comprised between the supranasal point, B, and the centre of the auditory canal, C. We then know the three sides of the isosceles triangle, C B C': it can be constructed on paper; the perpendicular, B O, can be dropped on the centre of the base, and this perpendicular, when measured, becomes the *third side of the facial triangle.*

It is thus alone that the triangle, A B O, can be constructed, of which the three sides have been determined; and all the trouble which we have taken is recompensed by the valuable indications which the triangle furnishes. It gives, *first,* the facial triangle, B A O; *second,* the auriculo-facial angle, B O A, by which the inclination of the *basis cranii* is measured; *third,* the length of the anterior cranium, B O; *fourth,* the length of the face A O; *fifth,* with the aid of the perpendicular, B P, it gives the height of the face, B P; *sixth,* it gives the length, A P, which measures the degree of prognathism of the face. This last length has by itself little value if it is not compared, on the one hand, with the total length of the face, A O; on the other hand, with the height of the face, B P.

We see how the notions furnished by the facial triangle are superior in importance and exactitude to those which are furnished by the mere facial angle. We thus comprehend how it is that Cuvier and Étienne Geoffroy St. Hilaire, to attain this, did not refuse to employ the most complicated constructions. But these complications, which did not daunt them, have rendered their successors timid; and though no person has failed to recognise the great utility of the facial triangle,

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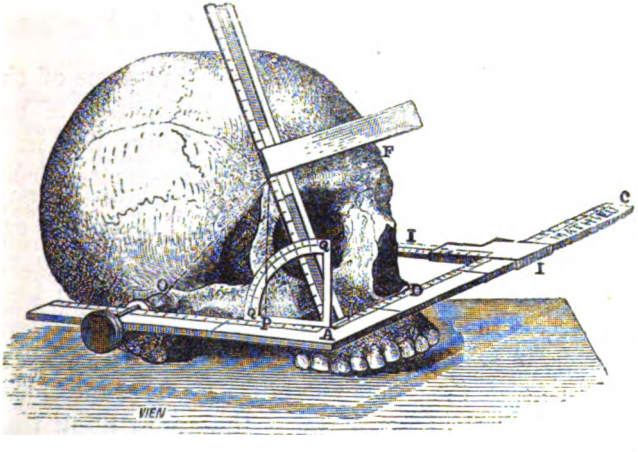
it has been allowed to fall into desuetude, some persons declining to take so much trouble, and some, because they were not familiar with geometrical constructions, and therefore feared to commit error.

To apply the facial triangle to use, it was accordingly necessary to simplify it, and to render it more easily understood. I did this three years ago, with the aid of my craniograph. Craniographical drawings, giving the exact proportions of all the points of the skull, permit all the angles and all the triangles imaginable to be measured; but the craniograph is not applicable on the living subject; and I have reason to believe that the goniometer, which I now forward to the Anthropological Society of London, is the first instrument which permits the elements of the facial triangle to be measured on the living subject, because the progress of the double rule, which I have described in my memoir on the projections of the head (*Bullet. de Soc. d'Anthrop.*, t. iii, p. 538) only gives the triangle by means of a construction.



When the goniometer is correctly applied, that is to say, when the two auditory plugs mark on the right and left branches the smallest number of millimeters, the edge of the ascending rod, A B, is placed exactly parallel to the median vertical plane of the head, and the triangle, A O B, is perfectly

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equal to the facial triangle. The length, O A, the base of the facial triangle, and the length, A B, which is the facial line, can be read on the millimetric scales; besides, the angle, O A B, or facial angle comprised between these two sides, can be directly measured on the quadrant, Q Q. We thus know the essential elements of the desired triangle. We can easily measure the height of the face, B P, and the extent of prognathism, A P. To obtain this, it is merely necessary to apply on the horizontal rod, O A, one of the edges of a small thin rule, of which the other edge, touching the point B, represents the perpendicular, B P; we also read on the horizontal scale, O A, the number of millimeters comprised between the point A, which is zero, and the end of the rule. This gives the amount of prognathism. Then applying a small rule to the vertical side of the square, we can measure the length, B P; we can then, without any construction, directly measure all the elements of the facial triangle, with the exception of the auriculo-facial angle, B O A. If it is desired to measure this last angle, we are obliged to construct the facial triangle on paper, or at least to have recourse to calculations which render the use of tables of curves necessary.

My goniometer is not a more exact one than some of those which are already known. But it has the advantage of being more simple, more easy to manage and to carry, and in fact less costly. I may also remark, that it has been constructed especially to measure the facial triangle. It will be easy to graduate the branches of other goniometers, and to render them also convenient to measure the facial triangle; but this would increase their price, which, in the case of M. Jacquart's goniometer, is so high as three hundred francs, whereas M. Matthieu (*Rue de l'ancienne Comédie à Paris*) makes mine for twenty-five francs. I am amongst those who think that the progress of anthropology can only be advanced by the union of a great number of observers, and that the instruments employed in investigation ought to be sufficiently simple and sufficiently cheap to be used by all. It is in order to arrive at this result that I have taken, as the base of my own instrument, the craniometer of Mr. Busk, with the sole difference

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that I have placed the brass pin of the auricular plugs actually in the axis of these plugs.

Excuse, Monsieur le Président, the length and the dryness of the details considered in this letter, and believe in the expression of my devoted sentiment.

(Signed) P. Broca.

To James Hunt, Esq., Ph.D., F.S.A.,
President of the Anthropological Society of London, Foreign Associate of the Anthropological Society of Paris, etc., etc.

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X.—*Contributions to an Introduction to the Anthropology of the New World.** By WILLIAM BOLLAERT, Hon. Sec. A.S.L., Corresponding Member of the University of Chile, of the Ethnological Societies of London and New York, etc., etc.

I WILL call the native inhabitant of the New World the Red Man, to distinguish him, as far as colour is concerned, from the white man of Europe, the brown of India, and the Negro of Africa. As in the white species, with their soft, long, and flowing hair of various colours, the complexion also varies; so corresponding variations exist amongst the brown and black species, with their almost straight, wavy, woolly, and crisp black hair; and amongst the red men, with strong, straight black hair, there are different shades of red, copper colour, brown and dark-brown complexion.

In the United States,† I have had the opportunity of examining many tribes, their colour varying from red or copper and through shades of brown. On the shores of the Spanish

* In 1859, I drew up a paper on the "Ethnology and Architecture of America." At the beginning of 1860 I met with a serious accident, which confined me very much to the house, and even up to the present time, during which period I remodelled the paper of 1859, and now call it "Contributions to an Introduction to the Anthropology of the New World."

Out of the researches I made for the "Contributions," have resulted the following:—

1. Past and Present Populations of the New World.
2. Palæography of the New World.
3. On the alleged introduction of Syphilis from the New World.
4. On the Astronomy of the Red Man.

Nos. 1, 2, and 4, will be found in the first volume of the *Memoirs of the Anthropological Society*: No. 3, in the November number (1864) of *Journal* of same society.

5. On the recently discovered Maya Hieroglyphic Alphabet of Yucatan.
6. Contributions to an Introduction to the Anthropology of the New World.
7. Examination, by the Maya Alphabet, of the Mexican and other Codices; also, the Hieroglyphs of Mexico, Yucatan, Copan, Palenque, etc.

Nos. 5, 6, 7 will appear in vol. ii, *Memoirs of the Anthropological Society*, No. 8; in preparation.

8. The Red Man's Place in Nature.

† "On the Indians of Texas," *Ethno. Soc. Trans.*, 1850.

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main and the Isthmus of Darien, I have seen Indians generally of a bright brown; on the tropical coast of Peru,* the native is of a brown colour, in the frozen Andes he is often of a dark brown hue, and in the eastern low lands some are light brown.

The Araucaños I have seen are of a reddish brown; and the Fuegians I have twice visited in the region of Cape Horn and the Straits of Magellan are dark brown.†

It has been said that to see one nation of Americans you see all; this is not quite the case even as regards colour; whilst as to form, feature, physical and mental development, there are marked differences and peculiarities resulting from causes we shall have to investigate.

I will now refer to what is said as to the relations between the inhabitants of the Old and New Worlds, and what nations are supposed to have visited America before Columbus made his great discovery. Out of a great mass of material on this point, I can only notice a very small portion. Some northern writers describe, according to certain manuscripts, the first voyage which the Scandinavians made to America in the tenth and eleventh centuries, under one Bjarna Herjulfson, going from Iceland to Greenland, and sailing along a portion of the eastern coast of America. That Leif, the eldest son of Eric the Red, went in A.D. 1000 to a part of the coast he called Helluland, supposed to be Newfoundland, then to Nova Scotia and Canada, to Vinland, or the land of the vine, which is thought to have been between Cape Sable and Cape Cod. That in 1004 a brother of Eric, Thorwald Ericson, went beyond Cape Cod to the south-east of Boston, and had an encounter with the Skraelings, or Esquimaux, in which he was killed. That in 1007, Thorfinn Karlsfenne and Snorre Thorbrandson, with three vessels, one hundred and sixty men and live stock, passed two winters in Mount Hope Bay, but the Esquimaux drove this party away. That in 1121, the

* "On the Indians of Peru," *Ethno. Soc. Trans.*, 1854.

† I may refer to one cause, at least, why among some Indian tribes there are people of a lighter colour than others; namely, the stealing of white women from the Spanish settlements, as did the Araucaños of Chile, the Jeveros of Ecuador, and by others.

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Greenland bishop, Eric, went over to Newfoundland; and it is often asserted that monuments, inscriptions, arms, utensils, tools, and remains of the dead, recently found in the states of Rhode Island and elsewhere, attest an entrance of strangers. I may observe that, as to the monuments and inscriptions, from a careful examination of what has been presented, I think they are but of little value, particularly as to what has been offered as Runic, and other Old World characters, such look to me more like the work of the Red Man; those purporting to be alphabetic are evidently spurious.*

We are told that the Esquimaux have a tradition of a people who wore white vestments, uttered cries, and made use of long rods, with pieces of cloth attached; and according to a mere conjecture, the country occupied by these strangers was Huitramanland, or Land of White Men, which lay along the Chesapeake Bay. The story is, that in A.D. 983 a violent storm cast upon the shores of America the renowned Are Marson of Reykjanes, of Iceland, whose grandson certified that certain Irishmen had assured his uncle, according to the verbal relation of Sigardson of the Orkneys, that the name of Are Marson was known in Huitramanland. From another, and recent source, we are informed that the Icelanders and Greenlanders, after they had gone south, went north as far as 72° 55′; that on the east coast of Baffin's Bay, in one of the Women's Islands, north-west of the present Danish settlement at Upernavik, they set up three stone pillars, marking the limits of their discoveries; the Runic inscriptions on them, according to Rusk and Magnusen, give the date of 1135.

I do not entirely discredit that there may have been accidental visits from Europe to the New World, or even from China and Japan, long before Columbus found America to be that wondrous barrier to his reaching Cathay and the spice islands of the east; but the strangers from the west and east

* See my paper on "The Palæography of the New World, and Examination of the several Spurious Arrangements of Ancient Writing, etc., purporting to be American."—*Anthropological Review*, May 1864, and vol. i, *Anthropological Societies' Memoirs*, 1864.

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have left no trace of tongue or vestige of art in America, at least as yet none have been discovered.

We now come to the dreamy ideas of Rabbi Ben Israel, who wrote the *Hope of Israel,* in consequence of some erroneous observations of Montesinos,* by which the Rabbi laboured to prove that the Americans had descended from the nine and a half tribes, conquered and carried captive from Samaria! A voluminous list of writers follow in this unsatisfactory track. Circumcision has been mentioned by some old Spanish writers as having been practised in the New World; that this operation was performed there, I think most problematical.† Some of these authors state that a few Jews came from the east, others from the west, having crossed Persia and the frontiers of China, and came in by Behring's Straits! Other writers consider the Canaanites as the first inhabitants of America, who proceeded by Mauritania, and landed "*somewhere*" on the shores of the Gulf of Mexico! Then fifteen hundred years after the expulsion of the Canaanites by Joshua, the nine and a half tribes of Israel passed over by the way of Behring's Straits and assaulted the Canaanites! It was the late Lord Kingsborough's fanciful idea that the Red Man was descended from the Jews; and the magnificent work he published, assisted by Aglio, containing copies of the old Mexican picture-writing, is about the only useful portion of his extensive labours. Those who still persist in the search for the

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* This may be the Montesinos who composed an imaginative ancient history of Peru and annals. See my *Antiquarian, Ethnological, and other Researches, in New Granada, Ecuador, Peru, and Chile, with Observations of the Pre-Incarial, Incarial, and other Monuments of Peruvian Nations,* with plates. Trübner, London, 1860.

† B. de Bourbourg, *Hist. du Mexique,* iii, p. 526, says, that the priest made an "entaille à l'oreille et au prépuce, mais si légère qu'à peine il en sortit quelques gouttes de sang;" and in a note, quoting Duran, observes, "these details are called circumcision by the Spanish author, and he is the only one who mentions this operation. Girls were merely slightly cut in the ear." And at p. 561, according to Torquemada, the Totonacs performed circumcision on the twenty-eighth or twenty-ninth day, and threw the cut piece into the fire. If a female child, an operation was performed on the clitoris.

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lost tribes of Israel, will be interested in hearing, according to Vigne, that in the vicinity of Potosi, when an Indian builds a hut, it is said that he kills a llama and strikes the door-posts and four corners of the room with the bleeding head.

Cabrera, a priest of Guatemala, tries hard to show relationship between the Americans and the Phœnicians. Vega, a bishop of Chiapa, who wrote about 1702, enters largely into the old traditions of Votan, of Guatemala, and of certain MSS. concerning his having gone from the Old World, purporting to have been written, two or three hundred years ago, in the Tzendal language (but in the Spanish character). Ordonez y Aguiar places Votan as the third sign in the Tzendal calendar; also, that he was descended from the Canaanites driven out of Palestine by Joshua! Sandoval says, America was peopled by the way of Ceylon; Colunio assigns a Gaelic origin; Charron, a Celtic; and Mr. Rankin, a few years since, wrote boldly that Manco Capac, Inca of Peru, was the son of Kublai Khan, and that Montezuma was the grandson of Askam, a noble Mongul of Tangut! backing up his idea, that as bones of elephants (which are fossil) had been met with in various parts of the New World, the animals—the bones of which had been found—had been brought from Asia by these modern Mongols! De Guignes,* relying too implicitly upon the chronicles of China, attributes Peruvian civilisation to emigration from the Celestial Empire or the East Indies! Paravay, in 1844, stated that the country of Fu-Sang, described in Chinese annals, was the Mexican empire. In 1847, Paravay further said that at Uxmal in Yucatan there had been found sculptured the Buddha of Java, seated under the head of Siva,—rather say, a species of analogous biune or triune deity, but certainly not the Buddha of the east.

I regret to observe that Rivero and Tschudi, in their important work on *Peruvian Antiquities*, state, "there is no doubt that Quetzalcoatl of Mexico, Bochica of Bogotá, and Manco Capac of Peru, were Buddhist priests, who by means of their superior learning, sought to rule the minds of the

* French resident in China under Napoleon I. See his *Chinese Dict.*, 1813.

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natives, and to elevate themselves to political supremacy." There is nothing to show, as far as my researches go, that the three worthies spoken of were Buddhist priests; rather that they may have been the originators of theocracies peculiar to themselves.

Velasco, the historian of Quito, other writers of his time, and even some modern ones, suppose that Peru was peopled from the west, making Easter Island a stepping-stone. However, there are far better stepping-stones, had such been required, in the Aleutian, and by the Diomede Islands in Behring's Straits. Markham, in his *Cuzco and Lima* and *Peru and India*, was rather in favour of the stepping-stone of Easter* Island (2,000 miles from the coast of Peru, and 1,500 from the nearest western land); but in answer to a letter of mine questioning such a view of the matter, he has abandoned this idea. Huematzin, a Mexican, writing towards the close of the seventeenth century, gives a dreamy account of the migrations of the Tezcucans from Asia! the idea of which he doubtless got from the Spaniards.

A work of some pretension is being published in parts by Trübner, namely, an *Aztec Codex*, translated by Sahagun (a monk who accompanied Cortez to Mexico), of the Gospels of the Acts of the Apostles, etc., edited by Biondelli. The editor hopes, by the clearest evidence, to prove the affinity of the Aztec languages with the Indo-European,—*nous verrons*. There are, however, two curious works by the Abbé B. de Bourbourg,—one the *Popol Vuh*,† published in Paris in 1861, with a French translation, from the Quiché, of the traditions and history of Guatemala; the other in 1862, a *Quiché and Spanish Grammar*; and a French translation of the *Tun*,‡ *or, Tragic Drama and Ballet of the Sacred Drum*; and although the Abbé believes in the Old World origin of the Red Man,

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* Easter Island, or Vaihu, is notable for the art the ancient inhabitants had attained in carving rude colossal figures out of the soft volcanic rock of which the island is composed.

† See my paper on the "Popol Vuh" in *Trans. Roy. Soc. Lit.*, 1863.

‡ See my paper on the "Tun" in *Trans. Roy. Soc. Literature*, 1865.

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he has brought together much useful and interesting material, particularly as regards the interesting ancient stone monuments so plentifully scattered over Central America.

Humboldt says, "the predilection for periodical series, and the existence of a cycle of sixty years, which is equal to 740 sunas of the Muyscas of Bogotá, *appear* to reveal the Tartarian origin of the nations of the New World." Again he observes, "I think I discover in the Americans the descendants of a race who, *early* separated from the rest of mankind, have followed up, for a series of years, a peculiar road in the unfolding of their intellectual faculties and tendency to civilisation." Again, "our knowledge of the languages of America is still too limited, considering their great variety, for us as yet to relinquish the hope of some day discovering an idiom which may have been spoken at once in the interior of South America and in that of Asia, or which may at least indicate an ancient affinity. Such a discovery would be one of the most brilliant which can be expected in reference to the history of mankind." In another portion of his masterly researches, he observes, "It cannot be doubted that the greater part of the natives of America belong to a race of men who—isolated ever since the infancy of the world from the rest of mankind, whilst in the nature and diversity of language, in their features, in the conformation of the skull," and he might have added, in their osteological structure and peculiar physiological characteristics, "are incontrovertible proofs of an early and complete separation." However, in some of Humboldt's later writings, particularly in the first German and and French editions of *Cosmos*, he is not so pressing on the matter of an exotic origin of the Red Man; these paragraphs, strange to say, do not appear in the English translations, but they will be found in *Indigenous Races*.

I have thought much on the early views of Humboldt, and with veneration for those passages in which he refers to the astronomical ideas of the Muyscas, as "appearing to reveal the Tartarian origin of the nations of the New World." My study of the subject of the zodiacs and lunar calendars of the nations of Mexico, Central America, Bogotá, and the

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calendar recently discovered in Peru, which I described to the Society of Antiquaries,* lead me to suppose that the astronomical ideas of the nations under consideration have originated entirely with themselves. In their own account they say they are a separate branch of the human family. Take the tradition of the Ojebways, for example, who believe that when the Great Spirit made the various peoples of the earth, he gave them their languages, complexions, and religions, as well as divers customs, manners, and modes of living, and that each nation had its distinct origin. Indeed, one main difficulty which the Christian missionary encounters in planting the gospel amongst the aborigines of North America, arises from their opposition to the scripture revelation of the origin of the human species from one pair.†

The late Admiral Fitzroy, in a paper published in 1858, "On the Probable Migrations and Varieties of the Earlier Families of the Human Race," directed attention to the people of Van Diemen's Land and South America, and the probability of early migrations; observing, that there is a striking resemblance between the Fuegians and the Esquimaux, between the inhabitants of the west coast of South America and the aborigines of Van Diemen's Land, and between the people of eastern South America and the Hottentots of South Africa. With some experience myself on this subject, I cannot for a moment agree with the above ideas.

Prescott, who thought deeply on the matter of the peopling of the New World, say from eastern Asia, concludes an elaborate chapter on the origin of Mexican civilisation thus: "The discrepancies are such as to carry back the communication to a very remote period,—so remote, that this foreign influence has been too feeble to interfere materially with the growth of what may be regarded, in its essential features, as a peculiar and indigenous civilisation." Here Prescott, with

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* *Proceedings of the Soc. of Antiquaries*, 1860. "Astronomy of the Red Man," see vol. i, *Memoirs of the Anthropological Society*, 1864.

† See a valuable work by Dr. Hayden on *The Ethnography and Philology of the Indian Tribes of the Missouri Valley*, Philadelphia, 1862.

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the monogenistic idea, gives us all the time we like to take; but his highly philosophic and well-trained mind must often have reverted to the polygenistic view of the matter.

I will now proceed to examine other materials I have been able to collect concerning the Red Man and his doings, before and after the discovery of America by Columbus.

Russian Possessions in America.—Nothing of any importance has been found hereabouts in the way of ancient monuments. The Red Men in this region and their languages (hieroglyphical writing is reported to have been met with as far north as 57°) have not as yet been sufficiently studied in regard to any connexion with probably Turanians, even in our own time, on the western side of Behring's Straits. This region is said to have a population of 10,000 souls; as many as 200,000 is given for the Rusian possessions on both sides of the Strait and the islands; but it is rapidly decreasing by war, diseases, and famine. It is a most inhospitable country, and where snow and rain fall almost incessantly. Esquimaux are sometimes found on its shores; these are, in all probability, of North Asian origin; they are short and fat, as a rule, whilst the Red Man is generally tall and thin. The term Esquimaux, or eaters of raw fish, was given to these people by the Red Indian; Huskie seems to be the name they give themselves. There are traditions of the descent of Norsemen on the shores of Greenland in the eighth century. There is also the history of Akigssiak, a great warrior, descended from *two races*,—the one Esquimaux, or inhabitant of the sea coasts; the other, that of the American Indians, or inhabitants of the interior of the country. He was finally conquered by the Esquimaux, and retired into exile.*

British North America.—Here we find large numbers of Red Men subsisting upon the products of the chase. Continual wars between the tribes have prevented much further mental development than they originally had, or powerful political organisation. At the present time there is a thriving

* Trübner's Linguistic Literature; also, see Kolosh, Kadiak, and other Russo-American languages, in Russian. *Die Pima Sprache und die Koloshen.*

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British population of three and a half to four millions in possession of the country. There are a few half-breeds, or English Mestizoes, children of white fathers and Indian mothers; much must not be expected of these hybrids, or, as sometimes called, mongrels. There may be about 180,000 aborigines in British America, divided into—1. Esquimaux. 2. Chippewyans (30,000), who call themselves "Sa-issa-Dinnis," or, "Men from where the sun rises." They believe they have descended from a dog; and that the Creator is a large bird, and that from his eyes issues lightning, and his voice is thunder. 3. Assiniboines, of the Sioux family (4,000 souls); the Kinstenaux (24,000); Hudson's Bay Indians (1,200). Canada, when occupied by the English in 1763, had 82,000. Of the Huron, Iroquois, and Algonquin, only 16,000 at present remain.

The Indians of Labrador are rather a fine race; some of the women are spoken of as handsome, and very determined; with lips full, tightly closed, dark intelligent eye, which, when it meets another, rests upon you with a tranquil, self-possessed gaze. Conflagrations are ruinous to portions of this country, depriving the Indians of their hunting grounds and rich pastures, when the Indians are reduced to starvation, their tribes decimated, and numbers compelled to seek temporary refuge on the coast, where, however, the fogs, damp, and change of habits of life kill them off. "Mr. Hind" (*Athenæum*, Nov. 21, 1863) "gives a melancholy picture of the poor Indian after his removal to the coast, where his friends and family sink one by one into an early grave, and he sits silent and motionless watching the sun slowly descending into the ocean, and dreaming of the great country in the far west, the happy hunting-ground of his future state, where his love of the chase may be exercised to the fullest extent, and abundant supplies of game will gladden his wigwam. The Indians not actually forced by hunger to the coast, are nevertheless anxious to go to it. The glad tidings of Christianity have penetrated to the interior of Labrador, and as the priests cannot come to them, they must necessarily go to the priests. 'No doubt,' said one of the trappers to our author, 'it's for the good of their souls, but the poor

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creatures die off as soon as they come; and to my mind, they might just as well live a few years in their own country; but then there's the religion; it is a difficult matter; perhaps it's better to die a Christian than to live a heathen.' "

Night-blindness, or nyctalopia, is a malady of the lumbermen of this region, which they ascribe to the constant eating of pork during the time they are engaged in felling trees. A complete change of air and diet is the best cure.

NEWFOUNDLAND is divided into two districts: one occupied by the cod-fishing colonists, some 120,000 in number; the other, by two or three tribes of Red Men,—one, the Micmacs, dwelling about the Bay of St. George, the other, the Etchmin. These tribes are but little known, and are not friendly to the whites. In 1857, the *Indian Good Book* was published for the benefit of the Penobscot, Passamaquody, St. John's, Mimac, and other tribes of the Abnaki Indians, by the Indian patriarch, Eugene Vetromile.

THE UNITED STATES OF AMERICA.—Here there does not appear to exist any important stone remains of antiquity. There were, however, periods when mound-building of earth by an "ancient race of men" was generally spread over a considerable area. These mounds consisted of tumuli of the mound and other forms, and mostly contained the bodies of chiefs; there were, likewise, extensive fortresses of earthwork. In the more northerly regions, when the English made their first settlements, the Indians were in a much ruder state than in Mexico, as dwellers in skin tents, and in huts of the boughs of trees; but possessed a more warlike spirit and greater physical vigour, so that the struggle between them and the invaders was of longer duration than in Mexico and Peru with the Spaniards.

It may be asserted, that from the shores of the Gulf of Mexico to those of the great lakes, tumuli and earthworks have been traced. In Ohio it has been estimated that there are no less than 10,000 raised tumuli, and the enclosures are rated at 1,000 to 1,500, some of which may be twelve centuries old. The mounds are of various dimensions; some only a few yards in diameter and a few feet high; others 90, with a base

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of 2,000 feet. They may be classed as enclosures of defence, sacred and miscellaneous. There are, also, earthworks in the form of men, beasts, birds, and reptiles, constituting *basso relievos* upon the face of the country. Mounds have also been met with in Oregon, on the Gila, and on the Colorado of the west.

Of these ancient mound builders we know but little; however, the rude nations in the north-east and west, and tribes of hunters and warriors found by the white invaders, were doubtless descended from the mound-builders, and were then counted by millions, say twenty millions, now only by thousands.* In the south were the celebrated Natchez, on the waters of the Mississippi, and supposed by some to have come from the north of Mexico; for although they adored the Great Spirit, yet they worshipped the sun and moon. They are said to have had temples to the sun, where was kept the eternal fire, guarded by priests and virgins. Their chiefs were called "Suns," as claiming descent from the orb of day, and ruled with absolute authority. When a great chief died, a number of his nation, of the same age, were strangled to accompany him on his journey to the other world. The Natchez rose upon the French in 1729, killing the whole of them at the "Natchez colony." In 1730, they in turn were attacked by the Choctaws and French, and nearly destroyed. Afterwards, a chief and four hundred were taken and sold as slaves in the French West India islands; some joined the Chickasaws and Muskogees, whilst others fled to the west. Thus perished the great Natchez nation.

Turning our attention to the south-west in the United States, we come upon extensive but now almost depopulated regions, including the great valleys through which flow the Colorado and Gila; and here we meet with the ruins of buildings, called by the Spaniards Casas Grandes, and Houses of Montezuma. We know not exactly who were the builders of these now abandoned piles, principally of sun-dried bricks, some looking as if they had been of several stories. Broken

* 140,000 in the various States, 360,000 in the territories.

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and painted pottery is found about these ruins. I have thought they may have been erected by some of the more northern nations of Mexico (from ancient Mexican-looking inscriptions on stone found about there), who, driven out of their lands not long before the Spanish conquest, went north, settled, and built these Casas Grandes, rather than that these monuments were erected by people, some say the very ancient Toltecs, when they were originally coming south to people Mexico; they do not look old enough, neither are they of old Cyclopean build. In this region there are at present a few scattered tribes, as the Moquis, Pimos, Marecopas, etc., having Mexican characteristics. On the river Yaquesila, a Casa Grande, in a ruined town, with walls and towers and a temple, was thus described by Padre Garces, in 1773. It was of *adobes*, or sun-dried bricks, three hundred and twenty-five yards in length by eighty in width. The foundation was of stone; there were some cedar rafters, much decayed, but bearing no marks of edged tools; there were remains of a canal which conducted water from the river. The plain on which the place stands was covered with broken pottery, prettily painted in red, blue, and white; pieces of obsidian were also met with.

An old Indian told Emory, the American explorer, when passing through this region, the following tradition:—"A female of great beauty lived in a lovely valley among the mountains; the men admired and paid court to her. She received their presents of maize, skins, etc., but gave no hopes of marriage to them in return. There came a general drought throughout the land, and famine followed, when she gave maize to the people, and her supply seemed endless. One day, when she was sleeping, a drop of rain fell on her bosom, she became pregnant, and was in time the mother of a male child, who was the founder of a new race, and that he built the Casas Grandes." Brantz Mayer observes on this subject, that the aborigines of North America, at the period of the discovery, were all more or less engaged in building for defence or worship; viz., mounds or earthworks, indicating the early condition of art, or the unprogressive characters of the builders,

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who either disappeared from the land, degenerated into the modern Indian, or passed southward to become the progenitors of a civilisation in more genial regions.

Going south, we again come upon the "Casas Grandes," or Large Houses, all of which are probably ruins of villages and towns occupied by the aboriginal tribes described by Castaneda, in the expedition of Coronado, in 1541, in search of the rich cities which had been reported to exist in these northern regions. Here we see perpendicular walls, the habitations built of sun-dried brick, and as they had no lime, they substituted a mixture of earth and ashes. Some of the houses were four stories high, while their interiors were reached by ladders from the outside, so as to render the external doorless walls protections against enemies in their wars. The village of Acuco, lying between Cibola and Tiguex, was built on the top of a perpendicular rock, which could only be ascended by three hundred steep steps cut in the stone, and clambering eighteen feet more by the aid of simple holes or grooves in the precipice. Gallatin observes that, at the time of the conquest by Cortez, there was, northwardly, at the distance of about 1,000 miles from the city of Mexico, a collection of Indian tribes, in a state of semi-civilisation, intermediary between that of the Mexicans and the social state of any other (northern) aborigines.

If we now examine the country of the mighty Mississippi and the river-glades of Florida, we have still ruins of the mound-builders. From Florida, it is likely the Red Man found his way by canoes—a distance of only sixty miles—to the West Indies, which he could also easily do from Yucatan, about one hundred and sixty miles off. In the south, the Island of Trinidad is only a few miles from the mouths of the Orinoco.

West Indies.—1. The Bahamas, or Lucayos, opposite the shores of Florida. 2. The Great Antilles, composed of Cuba, Jamaica, Hayti or the mountainous, and Porto Rico, or Borinquin. 3. The Virgin Islands. 4. The Caribbees. 5. The Lesser Antilles off the coast of Tierra Firme.

Columbus describes the natives of Guanahani (St. Salvador), one of the Bahamas, as being naked, well made, of good features,

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hair like that of the horse, colour *yellow*, kindly disposed, and that they painted themselves. The people of Cuba were peaceful, more domestic and intelligent, their habitations large and built of palm-leaves, but there was no arrangement of streets; statues of women and large masks were found. In the north-east portion of Cuba, the Indians are described as very gentle, without knowing what evil was, neither killing nor stealing; at Marien, in Hayti, as being frank and generous.

The small islands to the east, known as the Caribbees, and Jamaica,* were inhabited by a warlike race. The word for a warrior in their language is *Galibi* or *Carib;* and it may be that these made revengeful meals of their prisoners, and were called, on this account, cannibals by the Spaniards. Cuba was settled by the Spaniards in 1511, but before 1516 the aborigenes were annihilated; then African negro slavery was introduced.† In 1525, the gold-washings of Hispañola were already exhausted; and sugar and hides are alone mentioned as exports. The West Indies may have had originally a population of aborigines of about six millions,—not one at present remaining.‡

There is much to be written about the Carib portion of the Red race (probably at the time of the conquest some six millions of them), and their migrations, say from Florida and Yucatan, peopling the West Indies, the coasts of Colombia, and say their ascent of the rivers Magdalena, Orinoco, and Amazons.§ Some may have landed on the coasts of the

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* On Black River, at Jamaica, there are a few supposed descendants of Spaniards, and Indian women (Mestizoes), and are called Piratees,—the native name of a fish. Some crania of aborigines, met with at St. Elizabeth, have been artificially flattened, as at Titicaca, and other parts of South America.—Vigne's *Travels in South America*, 1863.

† See Helps' *Spanish Conquests in America.*

‡ See my "Past and Present Population of the New World," *Anthrop. Review*, August 1863; *Memoirs*, vol. i, 1865.

§ The river Amazons, called also the Orellana, the name of the first European who sailed down it to its mouth. In old Spanish works it is called the Marañon, and by the Portuguese the lower portion of the river is denominated Solimoes. It has long been a question as to the origin of the term Marañon. It is sometimes said that it is called Maran-i-obbo, or the River

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Isthmus of Darien, crossed it from the east, and have given rise to nations on the northern part of the west coast of South America; and old Spanish writers speak of people in this direction as "cruel Caribs."

No monuments of any account have been discovered in the West Indies, not even of the rudest stone habitations; here, indeed, the general warm climate, forests of palms, and other umbrageous trees, protected the inhabitants from the sun and rains. The Abbé B. de Bourbourg, in his *Commentary on the Popol Vuh*, thinks it probable that the Caribs were descended from the Nahuatl race of Mexico. My impression is that the West Indies were peopled from the mainland from several points, long ere the Nahuatl had existence; and it would appear that the Olmecs are the first people known in Mexico, and these are said to have been builders in stone; then come the Toltecs, or builders; the third nation, the Chichimecs; the fourth, the Nahuatlacs; and the fifth, the Aztecs, or Mexicans.

Texas.—I have explored the whole line of coast, also much of the interior, in various directions, but found no monuments, not even mounds or earthworks.* The Spaniards, after some years of unsuccessful fighting with the Indians in this region, handed it over to their monks, who built fortified missions, one being at San Antonio de Bejar, when a few Indians were somewhat Romanised; but with the separation of the colonies from the mother country, the missions were abandoned, the Indians and Mestizoes joining against the Spaniards. I visited

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of the Marans, from which "maran-tree", the balsam of copaiba, is derived. That a soldier was sent by Gonzalo Pizarro to discover the sources of the Piura river, who, on beholding this mighty stream, exclaimed "Hac mare an non?" is this a sea, or not? However, during my translation of Padre Fray Simon's voyage of the traitor Lope de Aguirre down this river, I found that in consequence of the continual *marañas*, entanglements, treasons, and murders of this sanguinary crew, Aguirre called his followers "his Marañones", from which I conceive the river had its name. This was in 1560. See "The Expedition of Pedro de Ursua and Lope de Aguirre in Search of El Dorado and Omagua," Hakluyt Soc. *Coll.*, 1861.

* See my "Observations on Texas," in *Geographical Soc. Trans.*, 1844 and 1850.

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the ruins of the Texan missions in 1841, which I found to be the abode of myriads of bats, the floors of the larger buildings deeply covered with their ordure.

The tribes of Red Men who roam about this State are principally known as Comanches, and now have horses; there are remnants of other tribes in Texas, many of which have been driven out of the United States. The Comanches, and neighbouring tribes, appear to me to have had some connexion in early times with the northern nations of Mexico.* All I have been able to collect as to the religious views, etc., of the Comanches, is that they believe in good and evil spirits, but claim supremacy for the Great Power, whom they call "Moonch Tave" or "Tah-a-pee", the sun being his habitation, and who, they represent, as like unto themselves, but of gigantic stature, who will never die, and is the original parent of the Comanche race. They suppose that febrile diseases result from the sun's displeasure. They calculate time by moons, by the hot and cold, wet and dry seasons, and that *Pachtli* is the name of the great council held about September. *Pachtli* is September, or the fourteenth month of the Aztec calendar.

Mexico.—This word appears to come from *Mexitle*, the habitation of the god of war. It is stated that Mexico was peopled from the far north; however, this I conceive is a mere idea. We may suppose that when the Red Man occupied this rich and beautiful region, he was but little removed from the savage state, then going through the phases of being constituted into families, then tribes and nations; these warred with each other; and this system of things went on until one of these nations,—say the Olmecs—became the masters of Anahuac on the table-land of Mexico. These Olmecs were builders in stone. After a time they went, or had to retreat, south from before the Toltecs. The Olmecs appear to have gone even to the Lake of Nicaragua, and some of them may have been the ancestors of the builders of Palenque, in Yucatan, Copan, and other piles of ornamented masonry thereabouts, including considerable quantities of hieroglyphical carvings.

* See my "Observations on Texan Indians," *Ethno. Soc. Trans.*, 1850.

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The Toltecs are said to have settled at Huehuetlalpatam,* north of the table-land, about A.D. 387, founding Tollan or Tula in 498; their monarchy commencing in Mexico in 510, and ending in A.D. 957. They are supposed to have built many pyramids, including that of Cholula, and gave to the year a more perfect division than heretofore. It has been recorded, that the causes of the dispersion of the Toltecs was the breaking out of diseases, famine, and unsuccessful wars, some of the people going to Yucatan or Ci-u-than, others to Guatemala; whilst those who remained in Tula were the germ of the Aztecs, or Mexicans.

The Tezcucans, or Chichimecs, now occupy the valley of Mexico, commencing their kingdom about A.D. 1120, ending 1516. The Tepanecs of Acapulco commence their monarchy about 1100, and end it in 1422. We now come to the Nahuatlacs, and then to the Aztecs or Mexicans; the latter say they left the mysterious and "unknown northern site of Aztlan (reported to have been to the north of the Gulf of California) about A.D. 1060, arriving at the valley of Mexico about 1227, founding the city of Mexico in 1325; now follow nine absolute chiefs† the Spaniards call emperors, ending with the death of Montezuma II, in 1503. Independently of the Aztecs under the Montezumas, there were other confederated, and even separate great states, as those of Cholula and Tlascala, the origin of which is very obscure. Then follow the independent Tarascos of Michuocan; the barbarous Ottomies, Olmecs, Xicalancas, Mistecas, Zapotecas, and others; some of

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* See *Amer. Ethno. Soc. Trans.*, vol. i, p. 162.

† *Chief.* In works connected with Spanish America, a chief is termed *cacique*, which would lead one to believe the word was of American origin. Humboldt supposed it to be a Haytian word; however, during my translation of the voyage of the traitor Lope de Aguirre down the Amazons, for the Hakluyt Society, from Padre Simon's *Noticias Historiales*, I found it stated in the glossary that the term *cacique* for a chief had been imported by the Conquistadores, and Españolised by them from the term for a chief used at Mazagan in Morocco. The original, I suppose, was *sheikh*. In Mexico, the name of a chief was *Tecla*; in Bogotá, *Zipa*; among the tribes of Darien, *Tiba*; among the Quichua, or Inca Peruvians, *Curaca*; amongst the Aymaras, *Maillco*; in the Auracano it is *Ulmen*.

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these may have preceded the Toltecs in the date of their settling in Mexico.

The Aztecs continued building after the peculiar fashion of their predecessors, but in some instances there was a decadence in the style of architecture. Their colossal pyramids (unlike the Egyptian), the summits of which were used as altars and for human sacrifice. The great pyramid of Cholula had a base one side of which was over 1,000 feet, more than double that of the pyramid of Cheops in Egypt; it had four receding platforms of equal elevation. The perpendicular height was 645 feet; on the highest of the four platforms was the altar to the god of air,—a divinity known before the advent of the Toltecs to power. This pyramid is built of *adobes*, or sun-dried bricks. In cutting a road through it, a square stone chamber was met with, supported by posts of cypress; it contained two bodies, two idols of basalt, and a number of vessels varnished and painted.

At Teotihuacan, eight leagues north-east of Mexico, are two large pyramids, their bases were 645 feet, height 171 feet, composed of four platforms with steps, and surrounded by hundreds of smaller ones in files or lines. The two larger are made of clay and small stones; the casing is a thick covering of porous amygdaloid. On their summits were colossal statues covered with gold,—one to represent the sun; the other, the moon. Independently of such wonderful works, temples, palaces, extensive habitations, with fortresses and walls to protect the cities, were built of stone and lime by the Mexicans, some of the architecture being very ornamental. Then we have their peculiar zodiacs, calendars, and astronomical instruments, details of which I have given in my account* of the "Astronomy of the Red Man."

Brantz Mayer, who follows previous writers, observes, that "The Aztecs, and perhaps their predecessors in the valley of Mexico, possessed a picture-writing, chiefly used for the recording of facts apart from abstract ideas. This picture-writing was nearly all destroyed by the Spaniards. It consisted of several elements:—a system of symbols to denote

* *Memoirs of the Anthropological Society*, vol. i, 1864.

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years, months, days, seasons, the elements, and events of frequent occurrence; an effort to delineate persons and their acts by rude drawings; and a phonetic system which, through objects, conveyed sounds that, simply or in combination, expressed the facts they were designed to record. This imperfect and mixed process of painting and symbolising thought was stopped at this stage (?), for it was the extent of Aztec invention at the period of the conquest, and it is difficult to judge, from the known character of the people, whether further progress would have been made." When treating of Yucatan, I hope to be able to show there is the probability that the Aztecs may have had an hieroglyphic alphabet.

The greater portion of Mexican architecture has been ruthlessly destroyed by the Spaniards, in Mexico, as well as in other parts of America; monuments of all descriptions have been pulled down, and their ornamentation defaced, many of these precious relics finding their way into modern buildings. The stones originally used in the temples, both in Mexico and in Peru, are found constituting parts of Romish churches; the houses of the virgins of the sun turned into convents; the schools of the aborigines into monasteries; and the palaces of native rulers became the dwellings of the Conquistadores. But one of the greatest enormities committed by the Spanish priests was the collecting into piles the Mexican pictures, symbolic, and perhaps hieroglyphic writings, and burning them. Had these been spared, much more would have been unfolded to us of the early history of the country. The glowing pages of Prescott in particular tell us of the refinement, and interesting architecture at the period of the conquest. The causeways on the Lake of Mexico were so much admired for the geometrical precision with which the work was executed, also the solidity of construction. They were composed of huge stones well laid in cement, and wide enough for ten horsemen to ride abreast,—say thirty feet. In vol. ii, of Helps' *Spanish Conquest in America*, there is a drawing-plan of Mexico of the Montezumas. It is seen to be built in the middle of the great lake, surrounded by walls. In the centre of the city is the great square with its temples of sacrifice;

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this was surrounded by groups of buildings, and the famous causeways which connected the city with the mainland. Outside the walls are seen neighbouring cities. Brantz Mayer, i, p. 39, gives a modern drawing of the great temple restored, and description. Tezcuco was filled with stately edifices. The building for the public offices extended, east and west, 1,234 yards, and from north to south 978 yards. It was surrounded by a wall of unburnt brick and cement, eight feet wide and nine feet high for one-half the circuit, and fifteen feet high the other half. The apartments of the royal harem, we are told, were equal to that of an eastern monarch. The better sort of edifices in Cempoalla were of stone and lime coated with stucco, looking like burnished silver; there were others of sun-dried bricks; and the poorer were of clay and earth. All were thatched with palm-leaves. The palace stood on a steep terrace of earth, and was reached by a flight of steps.

Cortez compares Tlascala to Granada, but that it was larger. Ajotzinco was a city of considerable size, the greater portion standing on piles in the water. Canals intersected it instead of streets. The houses were of stone, commodious, and with style. Midway across the lake of Chalco was Cuitlahuac, distinguished by the beauty of its buildings. The royal residence of Itzapalapan contained twelve to fifteen thousand habitations, and according to Cortez, they were equal to any in Spain; they were of stone, and the spacious apartments had roofs of odorous cedar-wood, while the walls were tapestried with fine cotton stained with brilliant colours. Here were the celebrated zoological gardens of Montezuma. Cool arched galleries led into the different parts of the gardens, to the marine and freshwater basins containing waterfowl,—to the birds of prey, falcons, and eagles,—to the alligators and serpents. There was a building containing the dens of the pumas, jaguars, ocelots, bears, wolves, and other wild animals; three hundred slaves were employed in the gardens.

When Yucatan was first visited by the Spaniards, they were astonished at the size and solidity of the buildings; they were much struck with the architecture met with opposite to the island of Cozumel. For details of the beautiful ruins of

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Yucatan, I refer to Stephens in particular. The cartouches of inscriptions are supposed to be in some sort of accordance with the present Maya language. Mayapan was one of the seats of monarchy, Chichen-Itza forming part of it. It is said that the chiefs rebelled against their ruler, destroying Mayapan about one hundred years before the Spanish conquest. M. Charnay, who lately visited Mitla, Palenque, Uxmal, Chichen, etc., taking photographs of the long abandoned ruins. See his work, first vol., Paris, 1863; also, No. 126, *Le Tour du Monde*, 1862, for drawings from photographs.* Stephens, in his two works on *Yucatan and Central America*, met with no less than forty-four ruined cities buried in the depths of the forests. As to Palenque, it is not easy to say who were the builders of the "stone-houses." The term Palenque is given to the residences of chiefs in Veraguas far to the south.

The ruins in this region are of a stately character, intended for the abode of great chiefs, and devoted to religion; their most general characteristic being that of a truncated pyramid. They are constructed of stone and mortar, ofttimes coated with stucco, and many have been painted red, yellow, blue, black, and white. Some are highly ornamented. The arch has been observed, but it is the Cyclopean, formed by superincumbent layers of stone overlapping each other. May not these ruins be identical with the cities of Colhuacan, Nachan, and Xibalba, mentioned in the *Popol Vuh*, one of the ancient Quichée records of Guatemala?

At Uxmal, or Oxmutal, the principal ruins are the so-called houses of the Governor (a palace), of the Tortoise (worshipped there), of the nuns (vestals), of the dwarf, and of the doves. About the middle of the eighteenth century, a portion was thus described: being "six hundred feet in length on each side; the apartments, the exterior corridor, and the

* Merida is the present capital of Yucatan, built on the ruins of the ancient city of Tihoo. When M. Charnay visited this locality, he says he saw a number of Indios bravos, who had been made prisoners, about to be sent to Cuba to be sold (or as it was said, for ten years servitude), at the price of £100 to £120 each.

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pillars adorned with figures, in relief, of serpents, lizards, and other animals in stucco; statues of men, with branches of palm in their hands, dancing and playing on the tabor; somewhat similar representations are seen at Palenque and Chichen-Itza; the ruins at the latter place are spread over a considerable tract—the most interesting is the house of the vestals, which is six hundred and thirty feet in circumference, and sixty-five feet high. Kabah presents similar characteristics to Chichen-Itza.

Brantz-Mayer (*Smithsonian Contributions*, 1856) says, "Architecture is one of those massive records which require too much labour to perpetuate a falsehood. The men who built Uxmal, Chichen, Palenque, and Copan (indeed, all the stone monuments in the New World), were far removed from nomadic tribes. Taste and luxury had long been grafted on the mere wants of the natives. Here, as in Egypt, the remains are chiefly temples, palaces, and tombs. Ancient architecture becomes the geology of humanity."

The "Red hand" has been observed here. Such an imprint of the red hand is used by some of the North American Indians to denote supplication to the Great Spirit; and it appears to stand in the picture-writing (of Mexico) as the symbol of power and strength. I have noticed the "Red hand" as far south as Arica in Peru, at the entrance of the cave in the Morro, the whole of which vicinity was an ancient depository of the dead.* I give for the original Indian population of Mexico twenty millions; at the present date there are about four millions.

Brantz-Mayer epitomizes the subject of Mexican monuments, commencing with those in Zacatecas, in the "Cerro de los Edificios, in 22° 30′ N. Chico-mozca, in this direction, said to be a sojourning place of the Aztecs on their southward march. Here are ruins of walls, plazas, pyramids, terraces, roads, pavements, etc. Some of the rock-built walls are twenty-two feet in thickness.

Mr. Norman, in 1844, visited a district the centre of which

* See my paper on "Peruvian Indians" in *Ethno. Soc. Trans.*, 1854.

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is 22° 10′ N., 98° 30′ W., and has described mounds, pyramids, edifices, tombs, fragments of obsidian knives, arrows, and pottery. Hewn blocks of sandstone were, in many instances, the materials used for building; and besides the images of clay, he found others rudely cut in stone in bold relief. In the vicinity of Panuco, an old town of the Huestecos, he found remains of architecture and sculpture scattered over an area of many miles, the history and traditions of which are altogether unknown. Three leagues south of Panuco are more ruins, known as those of Chacuaco, represented as covering about three square leagues, all of which seem to have been compressed within the bounds of a large city. Similar ruins are found at San Nicolas and La Trinidad. Sixteen leagues from the sea are the ruins of Papantla, which, in its palmy days, was a mile and a half in circuit. Nebel visited these, and gives a drawing of the beautiful pyramid called by the Indians "El Tajin." It is built of sandstone, squared, and covered with hard stucco. Its base, on all sides, is 120 feet, and it is ascended by a stair composed of fifty-seven steps, each a foot in height; it may be sixty feet from the ground. It consists of seven stories or bodies, each decreasing in size as it ascends from the base.

Near Papantla is Mapilca, where Nebel discovered pyramids, carved stones, and ruins of an extensive town. One sculptured stone was of close-grained granite, twenty-one feet long, and the figures differed from the ancient sculptures found east of the main Cordillera, and somewhat resembled those of Oajaca. Fifteen leagues west of Papantla are the ruins of Tusapan, supposed to be of Totonac origin; here is a fountain in human shape; and a pyramid of four stories, in which the pyramidal and vertical lines are again united, the second story being reached at a door by a flight of steps, which is built of stones of unequal sizes, and has a base of thirty feet on each of its four sides. The fountain is cut from solid rock, nineteen feet high, and represents a female in an indecent attitude.

On the island of Sacrificios, south of Vera Cruz, there are no longer any remains of edifices used for those burial rites

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which made the spot so celebrated at the period of the conquest; but the soil has yielded many relics, as vases, images, carvings, sepulchres, and skeletons, pottery and obsidian. At Misantla, near Jalapa, on the Cerro of Estillero, was discovered in 1835, the ruins of an extensive town. First, there is seen a broken wall of massive stones, united by cement, which seem to have been the boundary of a fortification of a circular area; in the centre a pyramid, with three stages, rises to the height of eighty feet, having a base of forty feet on two sides, by forty-nine on the two others. Beyond the encircling are the remains of a town, extending northward for nearly three miles. The stone foundations, —large, square, and massive,—are still distinguishable, and the lines of the streets may be traced in blocks, about three hundred yards from each other. There is a mound here; also tombs built of stone, whence carved figures, vases, and utensils were exhumed.

Three and a half miles from the Puente Nacional is an interesting and curious temple, and "seems to be an exceedingly steep pyramid of steps." In consequence of the inequality of the ground it is thirty-three feet on some of its sides, and forty-two on others. The top is reached by forty-two steps, so as to be almost perpendicular to the base. Its platform is forty-eight feet broad and seventy long. It is composed of sand, lime, and large stones. An entrance was discovered from the west, but so small and clogged that the explorers were not disposed to venture within for fear of venomous serpents and insects with which the interior, in all likelihood, is swarming.

Yucatan and Chiapas. Fifty-four ancient cities have been discovered, many of them but a short distance apart. In Chiapas are the remarkable remains at Ocozingo and Palenque, between 16° and 17° N. Yucatan is crowded with monumental ruins at Maxcanu, Uxmal, Sacbey, Xampon, Sanacte, Chun-hu-hu, Labpahk, Iturbide, Mayapan, San Francisco, Ticul, Nochacab, Xoch, Kabah, Sabatsche, Labna, Kenick Izmal, Saccacal, Tecax, Akil, Mani, Macoba, Benanchen, Peto,

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and Chichen, in the interior of the state; and at Tuloom, Tancar, and in the island of Cozumel on its eastern coast.

Mr. Stephens believed that most of these cities were occupied by the original builders and their descendants at the time of the conquest. The style of ornamentation is said to indicate that they had not entirely abandoned the barbaric for the beautiful (that is, as the white man understands this question).

The plateau of Mexico was the centre of the Aztec population, which submitted to Cortez. The Spanish settlement which occupied the site of the ancient capital, very soon obliterated every architectural vestige of the aborigines. However, the size and sculpture of some of the large stones found are interesting; the image called "Teoyasmiqui" is cut from a single block of basalt, nine feet high and five and a half broad; the "sacrificial stone", also of basalt, is cylindrical, nine feet in diameter and three high; while the "calendar stone", or zodiac, of the same material, is eleven feet eight inches in diameter, and about two feet in thickness.

At Tezcuco there is a shapeless mass of burnt bricks, mortar, and earth, among which there are several slabs of basalt, neatly squared, probably remains of a royal residence. In 1825, Mr. Poinsett found a *regularly arched* and well-built passage, sewer or aqueduct, formed of cut stones of the size of bricks, cemented with strong mortar. In the door of a room, he noticed the remains of a *very flat arch*, the stones of which were of prodigious bulk. In the southern portion of Tezcuco are the remains of three pyramidal Teocalli masses. They adjoin each other in a line north and south; they are about four hundred feet in extent on each front of their bases, and constructed of burnt and sun-dried bricks. Three miles east of Tezcuco are the remains of Tezcacun. Here the mountain-rock has been cut into seats surrounding a recess in a steep wall, which, tradition says, was once covered with a calendar. The sculptures have been destroyed by the modern Indians, who cut them to pieces in search of treasure, as soon as they found the spot became an object of interest to foreigners. Hard by is another recess, cut in the solid rock, surrounded by seats.

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Three hours ride from Tezcuco, near Otumba, are the two pyramids known as the 'Houses of the Sun and Moon,' composed of earth and sun-dried bricks; but, in many places, the remains of a thick coating of cement with which they were encrusted in the days of their perfection, were still to be found in 1842. The base line of the 'House of the Sun' is 682 feet, and its height 121 feet.

In 18° 30′ N. is the Cerro de Xochicalco, or "hill of flowers," which, a few years back, was still crested by the remains of a stone pyramid. The summit is gained by winding along fine spiral terraces. There were sculptures and hieroglyphics on this pyramid from three to four inches deep. The stones, some of which are seven feet long and two feet six inches broad, are all laid upon each other without cement. It would appear that the interior of the hill is hollowed into chambers.

In the State of Oajaca there is met with a large quantity of architectural and image remains. Some of the most interesting are at Tachila, where there are tumuli; at Mont Alban, tumuli and pyramids; at other places also, including Mitla. Most of the relics present pyramidal shapes; a good one is at Tehuantepec. In 1844, fine stone ruins were discovered near Quiotepec. Then there is the *spiral* tower of seven or eight stages near Tehuantepec.

Mitla, or Mictla. The Aztecs had only finally subdued the Zapotec people of this region about 1494. Mictlan means "place of sadness", a name which it may have received from the Aztecs; for the Zapotec appellation seems to be Liuba or Leoba, "the tomb". A large portion of the valley in the neighbourhood of three mountains, is said to be still covered with heaps indicating the sites of ancient architecture. Upright columns, three feet in diameter and fifteen feet high, and recumbent, some cylindrical, are still found standing, and crumbling walls. A courtyard covered with hard cement, and slabs of sandstone, door-jambs, niches or recesses for images, large stones forming a cornice some eighteen feet long, four feet ten inches broad, and three feet six inches thick; another, nineteen feet four inches long, four feet ten and a half inches broad, and three feet nine inches thick; a third, nineteen feet six inches long, four

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feet ten inches broad and three feet four inches thick. The outline of the adornments are called "basket-like", and reported to be beautiful. Grotesque as the Zapotec images are, they possess, in symmetry and originality, many more elements of art than are found in the Aztec or Mayan. A league north-east of Mitla are the remains of a curious Zapotec fortification.

I translate the following of M. Charnay (see *Tour du Monde*, No. 126, 1862, for drawings from photographs) :—

Izmal, to judge by the quantity of ruins, must have been the centre of a great population. According to some, they belong to the same period as those at Mayapan and Palenque, or they may be more ancient. Tradition makes this the place of sepulture of their prophet Zamná. The neighbourhood is studded with pyramidal buildings; two amongst them are the largest in the peninsula. They are opposite to one another; composed of a first pyramid of two hundred and fifty meters* on the side, and fifteen meters in height, serving as a base to another and smaller pyramid; on this last is a temple.

The base of another elevation has the remains of gigantic figures (see Stephens and Catherwood). Another and more gigantic figure has lately been discovered; the head, twelve feet in height, where much modelling in cement is seen. The ancient road from Izmal towards Merida is thus described. It goes for a mile or two alongside the present route, and on entering the forest, under a bed of humus, is discovered a beautiful road of seven to eight meters wide, paved with enormous slabs, which is covered with a layer of cement two inches in thickness; the road is, above the ground, a meter and a half, so that during the great rains the travellers by it were kept from the water. The cement looks as if it had only just been laid; what is remarkable is the thick bed of humus on this road.

Chichen-Itza belonged to the old country of Mayapan, destroyed about 1420; but this spot maintained its independence

* The mètre is 39·37079 English inches.

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until 1697, when it was ruined by the Spaniards. The author had his quarters in a room of the palace. The circus was called by the people the church. The emblems seen here show that the very men of the nation came here to try their strength with wild animals. Here are representations of the eagle, serpent, jaguar, fox, owl, etc.; of all these there only remain the bas-reliefs of jaguars, represented two and two, and separated by a round ornament full of small circles. It was formerly a monument composed of two pyramidal bodies, was a base of one hundred and twenty meters, with a platform on the summit for spectators. The second is covered with paintings of warriors and priests, some with black beards and draped in long tunics, the heads ornamented variously. The colours employed are yellow, red, and white. The two columns contain bas-reliefs of jaguars. There is a pyramid to the right of the above in which there is an apartment, and fixed in the wall the famous ring which served in their bull-game.

The so-called palace of the nuns is the most important monument, particularly for the richness of its sculptures. Above is a beautiful medallion of a chief, on his head a crown of feathers. The frieze that surrounds the palace is composed of a large number of large heads of idols, the noses of which have figures on them. These heads are separated by panels of cruciform work, common in the ruins of Yucatan. The interior of the edifice is composed of five habitations, the forms of which are similar to those at Palenque, and do not vary; the arched roof composed of superincumbent layers overlapping each other. The lintels of the doors are of stone,—there are very few in wood. The principal portion of the so-called palace of the nuns is flanked by two wings, placed at unequal distances, and supported by a perpendicular pyramid, upon the platform of which is a curious building; this again is surmounted by another, the whole forming three stages or stories. The first platform is gained by a gigantic staircase of forty-five steps.

The building denominated the prison by the present natives is well preserved. It is placed in a pyramid, composed

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of a building with three doors to the west, giving light to a gallery the whole length of the palace. This gallery has three apartments, receiving light from three doors, corresponding to those without. No windows have been noticed either in these ruins of Yucatan, Mitla, or Palenque. Other ruins are seen all around, such as the Caracol, shell-like or winding; the castle is upon a pyramid a hundred feet in height, near the palace of the nuns, totally deprived of its sculptures; heaps of worked stones show where other edifices have been.

The civilisation of Chichen seems to have been more advanced than that of Izamal, where the pyramids and colossal figures denote a greater antiquity, but with less perfection in the details. At Chichen, the great mass of ruins shows that it was really a city; the existence of public places leads one to suppose that their civil position was an advanced one, or that from an absolute theocracy they had passed to a military theocracy.

The Abbé B. de Bourbourg, in his translation of the *Relacion de las Cosas de Yucatan* (Trübner, 1864), by Diego Landa, furnishes the account and signs of the hieroglyphic alphabet of the Maya language. Landa was the second bishop of Merida (1573). This is an important key to further knowledge of Central American and Mexican history. Landa says "they had certain characters or letters by which they wrote in books ancient histories and their sciences, which they well knew and taught. We burnt these, at which they were much grieved." This discovery forms the subject of my communication to the Anthropological Society,* with plates of the alphabet, months, and days of the month, which comprises all we know at present of the Maya characters.

I may mention that I am occupied in comparing the hieroglyphics of Yucatan, Palenque, Copan, etc., as well as the Dresden Codex (which last appears to be a Maya and not a Mexican MS.), by the Maya alphabet.

Central America.—At the period of the conquest it in-

* *Memoirs of the Anthropological Society of London*, vol. ii, p. 46.

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cluded the great and interesting region of Guatemala. At present, the political divisions are Costa Rica, Nicaragua, San Salvador, Honduras, Mosquitia, and Guatemala. With regard to Guatemala, following its history by Juarros and the recent researches of Abbé B. de Bourbourg, we learn that one great among other nations—the Quiché—had had several dynasties of chiefs, called by the Spaniards kings, and that their *Popol Vuh* or ancient history, may have even been the original of *Teo-Amoxtli*, the divine historical book of the Toltecs.

The whole of Guatemala is studded with stone ruins of early times. It was in translating the French version of the *Popul Vuh*, and the drama of the *Tun*, or, *Sacred Drum*, that I was much struck with the number of nations enumerated, their works and doings; but especially with the power of the kings of Xibalba, to the north-east of Utitlan, *the magnificent*, the capital of the great Quiché nation. A careful comparison of the *Popol Vuh* with other compositions on the subject, would clear away many difficulties surrounding the early history of the nations once occupying Central America.

The ruins of Copan, in Honduras, may, for the present, be classed with those of Yucatan; their extent along the left bank of the river Copan alone is about two miles, but how far they extend into the depths of the forests on either side has not been ascertained. Brantz Mayer observes, that the Aztec arms were triumphant throughout all the plains that swept down towards the Atlantic and Pacific, and penetrated, as is alleged by some authorities, even to Guatemala and Nicaragua. For other details I refer in particular to Squier's *Central America and Nicaragua*, Brantz Mayer's *Ancient and Modern Mexico*, M. Charnay's *Tour du Monde*, No. 126, 1862, for drawings from photographs; also to Salvin's forty-eight beautiful photographic views of the *Ruins of Copan*.* The original population of Central America may have been ten millions; there may be one million at the present time.

ISTHMUS OF DARIEN, VERAGUA, ETC.—When first visited by the Spaniards, the natives were profusely ornamented with

* Published, with description of Copan, by Smith, Beck, and Beck, 31, Cornhill, London.

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gold objects, and the deities they adored were of the same metal. Hereabouts were the Cothos, Borisques, Utelas, Bugabás (in the Chiriquí country), Zunes, Dolegas, Chagres, Zaribas, Dorazques (Dorachos), etc. Lately, in the Chiriquí territory, many ancient Indian tombs have been opened containing large quantities of figures of men, women, deities, animals, apparently cast; well-made and graceful pottery, some with a species of inscription on them, which may be of Doracho origin; pillars, and grotesque statues of stone; and large boulders covered with engraved figures of human faces, celestial objects, animals, etc. These appear to have been the work of an earlier people than the Dorachos.*

New Granada.—In 1861, Mosquera, being president, called this country "Los Estados Unidos de Colombia." In very early times there were builders in stone, and even workers in gold, in a district now known as Timaná, and it has been supposed, but without much foundation, that they may have been of early Toltec origin; however, I have not been able to obtain the slightest tradition concerning the builders of the Timaná monuments, which consist of stone statues, tables of sacrifice with representations of the sun and moon, slabs of stone with designs of animals on them, and which may have had, in aftertimes, some connexion with the calendars or zodiacs of a later people, viz., the Chibchas.†

Near Neyba there are stone figures, probably of the Timaná period, of men, women, of the puma, jaguar, huanaco, monkey, frogs, etc.; also, a large stone table with four feet, or paws of animals, coming from a central pillar. Velasco, in his *Historia de Quito*, says, "the ancient people of this part of the country

* See my paper in *Ethno. Soc. Trans.*, vol. ii, new series, "On the Ancient Tombs of Chiriquí;" also, my "S. Amer. Antiq.," plates at pp. 30, 32. C. Carter Blake's paper on "Celts found at Chiriquí," *Ethno. Soc. Trans.*," vol. ii, new series.

† See *South Amer. Antiq.*, plate, p. 41. We are indebted, I think, to Caldas, a native of Popayan, for the first information of these remains. He was barbarously shot by Murillo, the Spanish general, and who at the same time burnt, in the public square, twelve cartloads of Calda's books, MSS., etc. Rivero and Tschudi give drawings of the Timaná monuments, but do not say how obtained.

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had rocks covered with "hieroglyphics," figures of animals, flowers, and others that looked like numerals. It is but lately that the existence of these interesting memorials has come to our knowledge; of the builders we know nothing. I call these Timaná and Neyba remains "Pre-Chibcha."

We now arrive at a more recent period, namely, that of the people the Spaniards found inhabiting the tableland of Bogotá, then called by the natives Theusaquillo, or, as sometimes now erroneously and pompously denominated, the Empire of Cundinamarca or Cundi-rumarca, which word is first met with in Herrera (lib. vii, dec. 5). J. Acosta, a good authority, tells us that it can have no connexion with the Chibchas. It appears to me to be a Quichua compound word, from *Cuntur*, the condor, *marca*, a district or country, or land of the condor. In 1811, it was raked out of old Herrera, and Bogotá, the capital, was placed in it by the patriots.

There is some doubt as to the name the Indians called themselves; and as they had a principal divinity, Chibchacum, the Spaniards christened the people Chibchas,—they have also been called Muizcas, which means "men or people." We will call them Chibchas. The earliest Chibcha tradition is that ere the moon was the earth's satellite, Bogotá was peopled by a barbarous race; that there came from the east an old man with a long beard, known by the names of Bochica, Nemquetaba, and Zuha, who brought them together. Bochica had a wife, but she disobeying him, he transformed her into the moon; and before he himself disappeared, gave them two governing chiefs,—one civil, a *Zipa;* the other ecclesiastical, a *Zaque;* similarly named chiefs governed the country until the period of the Spanish conquest.

About A.D. 1470, there were two great civil chiefs, the Zipa of Bogotá, and the Zipa of Tunja or Hunsa; the Zaque, or supreme priest occupying Sogamoso. The Zipa of Bogotá, Sanguanmachica, was at war with the Zipa of Tunja, Michna; the former fell in battle, and was succeeded by his nephew, Nemequene, who went against Michua, when Michua fell. Nemequene soon died, the power falling to Thisquesuza, who went against Quimunchalecha, the then chief of Tunja; the Zaque of Sogomoso

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interfered, and there was a truce for twenty moons, which brings us to 1533, when the Spaniards entered the country. There were then eight millions of Indians; now there are about 450,000. The temples of the Chibchas, in which they worshipped the sun, were large, and of stone. They embalmed the dead bodies of their chiefs, burying with them considerable quantities of gold objects, which are now known as *tunjos*, or sacred offerings, the principal forms being those of human figures,—probably of Bochica and his wife,—cast flat. (See my paper on "Ancient Gold Objects from America, in Mr. Mayer's Museum at Liverpool," *Trans. Historic. Soc. of Lancashire*, 1861, where there are drawings of two of these *Tunjos*; see also *Uricochea*,* for nine drawings. There are two or three *Tunjos* in the British Museum.) They cultivated the land, and had certain commercial relations with each other, as bartering gold for salt, etc.

They had curious and difficult to be explained calendars, or zodiacs, carved on hard stone, mostly of pentagonal and oblong forms; engraved on these were principally figures of the frog and serpent. The frog was symbolic with them, amongst other things, for water and rain, and called *ata* in their language; *ata* is also used for the numeral, one, and has a figurative character, in which can be traced the outline of a frog in the act of jumping.

Recently we have been favoured with an account of ancient ruins of stone buildings discovered at Tunja, say of an early Chibcha period, consisting of stone pillars, some four to five yards long. There are a series of thirteen pillars arranged in a circle of fifty yards in circumference, as if it had been a temple or palace; near to this are the remains of twenty-nine pillars fixed in the earth. These remains stand upon about two miles of ground. Hereabouts, in a dense forest, are a considerable number of wrought stones, probably a quarry. Uricochea writes thus:—"The Chibcha nation passed away, meteor-like, following the same track of the other indigenous people of America, being exterminated by the reeking sword,

* *Mem. sobre las Antig. Neo-Granadinas*, Berlin, 1854.

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the attendant on Christian fanaticism and the Spanish thirst for gold. Their civilisation has been lost to us,—their language lost; the people were annihilated.

QUITO OR ECUADOR.—This region may have been first visited by the Red Man, from what we now know as New Granada, also from its own coast on the Pacific. I am not prepared to agree with the Abbé B. de Bourbourg in his commentary on the *Popol Vuh*, that all the countries south of Mexico were visited by the Nahuas, or ancient Mexicans, and that they left a portion of their civilisation in them; but rather that the civilisation found here emanated from themselves.

The first information we have of this lovely country, with its palm-covered coasts, elevated and grain-growing tablelands, and mighty ice-clad volcanoes, is that the Cara or Caran nation went on conquest from the coast up the river Esmeraldas, and became the masters of Quito, then ruled over by a chief called Quitu. Of the Quitu's people we know but little; they were sun-worshippers, and had built a temple to this luminary on a high hill, called by the later invading Incas "Yavira," and by the Spaniards "Panecillo." A few rude remains in stone have been met with in Quito, supposed to be the work of the Quitus. We are told that the Caras, when they lived on the coast, had sun-dried brick and stone habitations; still there is reason to think that the stone ruins and statues, also remains of wells met with by Pizarro, at Manta, in 0° 57" S., and Punta St. Elena, in 2° 11', were the work of an older nation than these Caras. The Caras were more advanced in various ways than the Quitus; they built a square temple of stone, on the hill of Yavira, to the sun; it had a pyramid roof, and its door was to the east, so that the first rays of the sun fell upon a gold image representing the orb of day. The temple to the moon and stars was on an opposite hill. There were on each side of the temple of the sun gnomons to observe the times of the solstices. Their tombs were mounds, generally of rough stone.

When the Cara chiefs had become the rulers of Quito, they were called Scyris, or lords of all. B. de Bourbourg supposes

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that the word *Cara*—the name of the nation—came from *Carib* (Galibi). *Cara* is the Quichua word for Indian corn, *mahiz*, in Hayti; but I would not venture to say that they took the name of Cara from having been growers of *mahiz* or *maiz*. The later Incas conquered Quito; and the great Huayna Capac beautified the rude Cara masonry, building also much in the Incarial style, which is of a marked and distinctive character.

Rude works in gold are occasionally found in the ancient tombs, a drawing of one, from Cuenca, I have given in my *South American Antiquities*. Mr. Spruce (*Anthropological Review*, Feb. 1864) states that in 1860 there were discovered, on the islands of Muerto and Puná, various objects in gold; one was a statue, very creditably sculptured, six or eight inches high; others, consisting of thin plates, like a lady's muslin collar, covered with figures,—one of them had a hundred stamped figures of pelicans, each figure representing the bird in a different attitude. Only lately have I seen any remains of the plastic art from this land, namely, from the coast at the Pailon, near the equator, mainly of figures of grotesque character, sent to me by my friend, Mr. J. S. Wilson; however, one specimen was apparently modelled from life. This collection is in the British Museum. In my paper on these remains, in *Ethno. Soc. Trans.*, 1863, it is mentioned that this pottery appears to have been deposited, say in a tomb, then the land had been submerged under the sea for a period, and afterwards elevated by earthquake power. Two leagues north of Monte Christo, on the flat summit of a mountain, is a circle of thirty stone seats with arms,—these may have been used on solemn occasions by the Caras, or even by an older nation.

I may here allude to a custom of a still wild tribe of Indians in this country, details of which will be found in the *Ethno. Soc. Trans.*, 1863, also with a drawing, in the *Intellectual Observer*, April 1862. It is of the Jívaros, who cut off the heads of their principal prisoners; the skull is removed, and the skin dried in a particular manner, when it retains something of the features. It is deified with much ceremony, and known as the idol human head of the wild Jívaros. I have estimated

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that Quito had, before the coming of the Spaniards, some four millions of inhabitants; there may be now five hundred thousand.

Mr. Spruce, the eminent botanist, communicated to the Anthropological Society, in December 1863, through Mr. Markham, an interesting paper on "The Crystal Quartz Cutting Instruments of the Ancient Inhabitants of Chanduy, near Guayaquil."* These crystal lanceheads are found from Punta S. Elena to the town of Guayaquil, chiefly in low mounds laid bare by winter rains. Many have been met with by Mr. Spruce near the little town of Chanduy on the seashore, in middens, or refuse-heaps, with fragments of pottery and seashells. Mr. Spruce states that bones of large mammals are found near Chanduy, chiefly along the coast, where portions of the cliffs are continually falling in. Mr. Markham hinted that the descendants of the people who sat on the refuse-heaps and used quartz-crystal knives, may have done so while the megatherium and mastodon still wandered over the South American continent.†

Brazil.—Here we have an empire 2,600 miles in length and 2,000 in width, with scarcely an indication of stone monuments. Its aboriginal inhabitants having a luxuriant tropical country, thickly wooded, had natural means to protect them from the sun and rain. Here dwelt, at the period of its discovery by Europeans, very considerable masses of Red Men, say four millions,—there may be a million at present,—divided into Indios *Mansos*, or tamed, and *Tapiros*, or savage; they are generally of good stature, but low in the scale of civilisation. The most part are warlike, and ferocious when excited; but the practice of cannibalism towards prisoners is said to be extinct, if, as some authors observe, it ever really existed.

Chile.—We know nothing of the early history of Chile. Those warlike nations in the south were called by the Spaniards

* *Journal of the Anthropological Society of London*, vol. ii, p. lvii.

† See my *South American Antiquities*, p. 80, for observations on fossil-bones met with in that region.

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Araucanos.* The later Incas of Peru made inroads into Chile, but were not allowed to go further than the river Maule; even at Copiapo they had not much of a possession, although they received some tribute in gold and silver. No native monuments of stone have been found in Chile. There are a very few remains of Incarial fortresses in the south. The Araucano lived, and still lives, in villages of rude huts, and in encampments of skin tents, and is governed by chiefs called Toquis, Ulmenes, and Apo-Ulmenes. The Araucanos call themselves Moluches, or warriors; and Alapu-che, children of the land; Aucas,† or free men (in Quichua, *aucas* means an enemy, *aucani*, to fight). Their country was formerly divided into districts, or *Uthal mapus*, land of the four parts: as, 1. the Sea-coast; 2. the Plains; 3. the Lower Cordillera; 4. the Cordilleras. The Puelches, and some of the Pampa Indians, appear to be of the Chilian family, as are the Cunches of Valdivia, the Chonos and Poyus of the islands of Chiloe and Chonos. The Huilches are to the south of the Cunches; the Pehuenches are found generally in the Chilian Andes, between 34° and 37° S. At the time of the Spanish Conquest there were other tribes, commencing in the north and coming south, as the Copiapinos, Coquimbis, Quillotanes, Mapoches, Promaquis, Curis, Cauquis, Pencones, Antales, etc.

The graves of the present Araucanos are sometimes distinguished by a round post of wood, the top ornamented, according to some, in the shape of a double-headed eagle, to others, like a hat. In a cemetery of the Huilches, lately visited, there were logs rudely carved so as to represent the human figure. Chile may have had four millions of natives; there are in the present day about 20,000.

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* The term *Araucano* is one of reproach, meaning brigands, and ferocious fellows. The Indians call the Spaniards *Chiapi*, or bad soldiers; and *Huincas*, murderers.

† My friend, Major F. Ignacio Rickard, has recently deposited, in the museum of the Anthropological Society, two nearly complete skeletons of the Puelche Indians of Mendoza, and two complete skulls, with many of the long bones of some Aucas. These specimens, hitherto unique in any anthropological museum, will form the subject of careful description by my friend, Mr. Carter Blake.

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PATAGONIA.—No stone, or other monuments of antiquity, have as yet been found in these extensive regions. They were so called by Magellan, in consequence of their large feet. They seem to be divided into two large tribes; the Tehuelches on the north, the Inaken on the south, or those often seen on the south shores of Magellan Straits. They may comprise a population of eight to ten thousand souls. The Inaken, or southern Patagonians, believe in another life. God, or *Achekenat-Kanet*, is the author of good and evil. Old women are their priestesses. The year, *Kechnia*, is divided into lunar months. Their language is very guttural. They count up to 100, but this, as well as the 1,000, they have got from the Araucanos. When Capt. P. P. King, R.N., in command of the *Adventure*, was surveying in these regions, Caras-Ken was the name of the principal chief of the Patagonians. On the return of the *Adventure* to England in 1830, Capt. King kindly gave me a passage in this vessel, when I had the opportunity of visiting Juan Fernandez, Arauco, and the Straits of Magellan; in the latter region we remained several weeks.

The Chonos of Chile call the Patagonians *Cacahues;* the Araucanos, *Huilches*, or, men of the south. The Fuegians call the Patagonians *Tiremenen;* Bougainville called them *Chaona*, as they used this word so often. Falkner, who is said to confound them with others, denominates them *Tehuelets;* the colonists of El Carmen name them *Tehuelches;* but they call themselves, in the north, *Téhuelche*, in the south, *Inaken*.

The Fuegians could have come easily from the tribes of Southern Chile. The name of Fuegian was given to the inhabitants of Tierra del Fuego, in 1822, by Capt. Weddell; but those in the west called themselves Alikhoulip; those in the east, Tekenska; however, when I had to put in, by stress of weather, into Nassau Bay (just behind Cape Horn) in 1825, I only knew them as red and black Magellans. Captains King and Fitzroy divided them into four groups:—

1. *Yacana*, who inhabit the north, composed of from 500 to 600. These are somewhat like the Patagonians.
2. *Tekinsca* or *Kynhue* are to the south-east, about 500.

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3. *Alikhoulip* are to the west, and about 400.

4. *Pecherais* are in the centre. What is curious is the great difference between the languages of some of the tribes in such close proximity to each other, and communicating easily by canoes.

D'Orbigny thought the Fuegians were of the Araucano race; but the euphony found in the Araucano language is not in the Fuegian, which is very guttural. He also says the Tekinsca are small, like the Araucanos; the Yacuna-kunny, according to Capt. King, resemble the Patagonians by their height, colour, costume, arms, and customs. The gallant and persevering Captain Snow, in his cruise off Tierra del Fuego, 1857, says, the Fuegians are divided into seven tribes:— 1. Densmen. 2. Yapoo. 3. Tekeenica. 4. Alikhoolip. 5. Chonos. 6. Pechere. 7. Irees. When I was in Nassau Bay in 1825, and in the Straits of Magellan in 1830, the words *yab-skooler* appeared to mean, give us something to eat; *sherro*, a ship, boat, or canoe; *kaib*, no, or if disappointed; *chox-pitit*, little child; *jarjar*, yes; *uxchuca*, water, probably from the Spanish, *agua*. They used a few Spanish words, as *capitan*; *perro*, dog; *canoa*; *huanaco*, etc.

The PAMPAS family—some of them, as the Guaranis—were somewhat inclined to agriculture, and easily submitted to the Spaniards. The Charruas, Abipones, Botocudos, and others, were warrior nations, and could only be subdued by extermination. Nearly all the Charruas have been destroyed. In 1832, a chief, Varinaca Taconabe, a warrior, his wife Gayunsa, and Seneque, a medicine-man, were taken to Paris. The men soon died of despair. In 1834, the woman and her child were in Lyons. There may have been originally of the Pampa family four millions; the remnants are now included in the 100,000 in La Plata. After the conquest of the country, we have first in rank of population the Creole, or country-born, from Spanish parents. As the Indian was not a working individual, negro slaves were introduced. From the white man and black woman came the Mulatto family; from the black and red, the Zambo; the Mestizo from the white and red; and a variety of this interbreed is termed Peon or Gaucho, on the Pampas

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(Guaso in Chile, and Llanero in Columbia). These have been called the herdsmen of the Pampas; they are descended from the old Spanish herdsmen by Indian mothers. There was a terrible family of Mestizos, namely, the Mamelucos,* or mounted Gauchos, who sprang from the old Spanish herdsmen and the women of the north-west frontier of Brazil. They became the robbers of natives for the Indian slave-markets of Brazil. They even attacked the Spanish missions, stealing the reduced Indians; and they were not over-particular in making prisoners of the whites. However, in 1690, the Viceroy of Peru succeeded in putting a stop to this state of things by force of arms. During their marauding reigns they had stolen some two millions. In 1628-9, 600,000 of their captives were sold in Brazil, principally in Rio Janeiro.

At the end of vol. i. of *Molina* are supplementary notes from an anonymous work on Chile, printed at Bologna, 1776, where it is stated that between Mendoza and La Punta, upon a low range of hills, is a large stone pillar. It is called the "Giant," and has on it marks and inscriptions. Near the Rio Diamante, south of Mendoza, there is another stone containing marks, impressions of human feet, and figures of animals. On the track over the Andes, from Cuyo to Chile, are still to be seen some of the *tampus*, or Incarial resting places.

My friend, Major Rickard, in his *Mining Journey across the Andes*, etc., 1863, mentions, that in the valley of Barrial he came upon several ruins of ancient Indian villages, said to have existed in the time of the Incas. They consisted merely of the outlines of large, square, and oblong buildings, extending over a space of half a square mile. Some broken pottery was found there in a spot close to the ruins, on the flat summit of an immense mass of sandstone, which is pointed out as the burying-place of the old Indians. He was told that to the north there were several tombs, arched over and built up with masonry, so firmly cemented as to appear one solid mass.

* Does this term, *Mamelucos*, come from the Mamouel-tches Indians of this region?

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He observed, near this locality, some large stones, with to him unintelligible inscriptions on them.

M. Guinard, who was held three years (from 1856-9) in captivity among the Patagonians, gives much information about them; full details are found in Nos. 94 and 95, *Le Tour du Monde*, Paris, 1861. He divides the Indians of this extensive region into three great groups:—

1. The Pampero or Pampa Indians, from the Rio Salado to the Rio Negro, divided into seven tribes.

2. The woody region between the Lakes Bevedero and Urre Lafquen, and up to the Rio Diamante, is roamed over by the Mamoueltches, composed of six tribes; as the Ranquels-tches, Angueco-tches, Catrulé-Mamouel-tches, Guiné-Ouitrou-tches, Longeuil-Ouitrou-tches, and Renangneco-tches.

3. From the south of the Rio Negro, there are nine tribes of the Patagonians; as, Poyuches, Puelches, Caillihetches, Tcheoue-tches, Canguecaoué-tches, Tchao-tches, Ouili-tches, Dilma-tches, and Yakah-natches. M. Guinard fell into the hands of the Poyuches.

These tribes, as well as the Araucanos of Chile, speak nearly the same language. The greatest enmity prevails between the Indians and the whites. They recognise two superior powers; Vitaaouentron, the good,—his whereabouts not known, —Houacouvou or Gualichu, the evil power, who is on the earth, and commands the evil spirits. Their soothsayers, male and female, are losing their reputation; these pretend to be able to see into the bowels of the earth. Before eating or drinking, a portion of their food is offered to the Great Spirit. They turn towards the sun, as the envoy of the Great Spirit, and offering a piece of meat and spitting a little water, say the following:—"Oh, Father! great man, king of the earth, grant me, dear Friend, daily good food, good water, sound sleep. I am poor. Art thou hungry? Here thou hast to eat, eat if thou wilt." After his meal, which is principally of raw horseflesh, the Indian mixes tobacco (*pitrem*), some roots and herbs, with horse- or cow-dung, and fills his pipe; he now lies on his stomach and takes seven or eight inhalations rapidly, which he then sends through his nostrils; this generally intoxicates

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him. Men, women, and children smoke in this way.* The general occupation is the chase of deer and ostriches, pillage of the whites, care of their horses and cattle, horsemanship, and practice of the lance, lasso, and bolas.

The skin tent is in general use. When full dressed they wear the *poncho*, a waistcloth, and a fillet round the head. They pluck out all hair from the body, even to the eyebrows, painting themselves with coloured volcanic matter, black, blue, red, and white, brought to them by the Araucanos on their annual visits. The women wear woollen mantles, fastened by a large silver pin, and an ornamented girdle of leather; also, earrings and bracelets. They are not so ugly as the men, which may be accounted for by many being descendants from white female captives. There may be 40,000 in all, but are decreasing, particularly the Pamperos, who may have seven wives. They are very great gamblers, even with Spanish cards and dice. The great amusement is the *tchoecah, ouignou*, or ball-game, and are fond of intoxicating drinks. The Christians, whom they call *Huincas* (murderers in Araucano), sell them *poulcou*, or brandy. They procure other drinks from the fruit of the *algarobo* and the *trulca*.

Two religious feasts are observed by them; one in summer, to the Good Spirit; the other in autumn, to the Evil Spirit, when sacrifices of animals are made. A wife is obtained by making presents to the parents. Childbirth is easy to the female. At the birth of a child the parents decide if it is to live or die; if the latter, it is strangled and thrown to the birds and beasts of prey. On the death of an Indian, his body is wrapped up like a mummy, and placed lengthways on the favourite horse of the deceased; the left leg of the horse is broken, so that its limping may add more solemnity to the occasion of taking the body to the grave, when the horse, and other animals, are killed over it. The widow must remain so a year before she can marry again.

PERU was called *Tahuantin-suyu* by the Incas, or, the land of the four parts. Cuzco or Ccozco was the Inca's capital,

* A somewhat similar method of smoking is used by the Bechuanas of South Africa. *Vide* Mr. Baines's *Explorations of South Africa*.

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and means, the centre of the country; or may be from Ccozcos, heaps of stone or earth, which had to be cleared away for the building of the city. Birú was the name of a chief south of Panamá, and there is a river on the coast called Berú. An Indian not understanding what a party of Spaniards asked him as to the name of the country, replied, "Pelú," pointing, at the same time, to a high mountain; on this, one of them exclaimed, "acabemos, aqui todo es Pirú," or, "Let us make an end of it, as to the name of the country, for all is called Pirú."

I will divide the following into two sections, the Pre-Incarial and Incarial.

The most interesting of the pre-Incarial remains are those existing at Tia-Huanaco, in 16° S. to the south of Lake Titicæca, and at nearly 13,000 feet above the level of the sea. For other observations, I refer to Cieza de Leon (A.D. 1532-50), who visited them; and for English readers to Mr. Markham's translation, *Hakluyt Soc.*, 1864; to my volume of *South American Antiquities;* to a paper of mine in the May number of *The Intellectual Observer*, 1863, where there is a plate of the sculptured monolith portal, from a photograph; Vigne's *Travels in Mexico and South America*, 1863; and Markham's *Travels in Peru and India*, 1862.

1. The Great Mound, 918 feet in length, 400 in breadth, and 100 to 120 feet in height; a fortress and temple may have been placed thereon.

2. Ranges of Pilasters; some are worked, others rough, of hard stone; they are about 18 to 20 feet in length.

3. Remains of large slabs of worked stone, with seats, supposed to have been a hall of justice, each slab 36 feet square and 5 feet thick. About here, numberless pieces of stone of all sizes, wrought into square, cruciform, and triangular figures, many of them grooved, as if for windows and doors; some have been united by metal clamps.

4. The broken sculptured monolith portal. It is 10 feet above the ground, in width 13 feet 3 inches; it is formed of one block of hard trachytic rock; the doorway is six feet high. The eastern face has three lines of sculptured figures, in *alto-relief*, of men, and figures of men with birds' heads, each line

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has sixteen figures, and in the centre a larger human figure. The figures with human heads may denote chiefs; those with the apparently condors' heads, as the sun's messengers, and attendants on the chiefs. Cieza de Leon says, "but what I noted most particularly, when I wandered about over these ruins, was that from these great doorways there came out other large stones, upon which the doorways were formed, some of them thirty feet broad, fifteen or more long, and six in thickness. The whole of this, with the doorway and its jambs and lintel, was all of a single stone."

5. Colossal stone idols stood on the mound. The following dimensions are given for one of the heads:—from the chin to upper part, 3 feet 6 inches; in diameter, 2 feet 7 inches, or the whole height would be about 18 feet; they are of basalt, and covered with sculptures of human figures, with lizards' tails. There were, between the pilasters and the wall that surrounded the mound, stone statues of men, women, and children.

6. A cyclopean wall of stone seems to have surrounded the great mound inside the pilasters. Acosta measured a block of stone, most probably of this wall, 30 feet in length, 18 feet in width, and 6 feet thick, = 200 tons (there are some masses of stone in the fortress of Cuzco 50 feet in length, 22 feet broad, and 6 feet thick, = 1,000 tons).

7. A monolith building, which may have had a square court of 90 feet, and its walls 12 feet high; on one side of the court was a hall 45 feet long and 22 feet broad, the walls 9 inches thick. If dependence can be placed on these statements, we have here a monolith of 8,678 tons!

8. Old writers speak of large stone edifices from 300 to 600 feet in length. The portals, or doorways, were perpendicular, and not like the Incarial, which inclined inwards at the top.

Near to these ruins are two tombs, like square towers, of the old Collahuas. There are also remains of an Incarial palace, which may have been built by Mayta Capac, the fourth Inca, who died about A.D. 1156. He conquered the Collas; and being here when he received news, brought in great haste by a messenger, exclaimed, "Tia" or "Tiai

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Huanaco," which, in Quichua, means, "Rest, or sit thou fleet as the Huanaco." Mr. Vigne calls this locality *Acapana*, which Mr. Markham, in his *Quichua Dictionary*, translates as "the red appearance of clouds at sunrise, sunset, or any bright tinge in the sky." There is a very misty tradition that a ruler named Huyusutus built Tia-Huanaco, and that its ancient name was Chuachua, which may mean "clear water"; *huyu* may mean a hall, or palace, or buildings. Can we say, "the city of the clear waters of the chief Sutu"? Mr. Markham, in his *Peru and India*, observes, "The forefathers of the present Aymarás established a civilisation, of which we have no records, save the silent evidence of those cyclopean ruins of Tia Huanaco, and others."

Near Vinaque, not far from Huamanga, there are remains of large edifices, and Cieza de Leon calls them "great, and very ancient edifices," which are now in ruins. These, and some other ancient ruins, do not appear to me to be like those erected by the Incas. It is reported that certain letters were found on a slab in these buildings. In Chachapoyas, at Llaventu, to the east of the Marañon, it is affirmed there are ruins, some of conical form, with large statues; the ancient people of this region worshipped the condor and serpents. At Cuelap, in this direction, we have descriptions of ruins of walls, chambers, and tombs; nothing is known of their history. At Curumbá, seven leagues from Andaguaylas, is a square building of masonry; nothing is known of its authors. Some of the Chulpas, near Puno, are tombs of ancient Collas, having sculptures of lizards, serpents, and other objects on them.*

* The following is a description of a Colla, or Aymará Chulpa, translated from *Le Tour du Monde*, No. 146, 1862, constructed of large Cyclopean blocks of stone, built up from the plain, and covered by a slab. On its eastern base was a small opening, and a low doorway on another side. It was ten feet square and eight feet high. The walls inclined towards the top, and very thick. From its weather-beaten appearance, it must have been many centuries old. It contained about a dozen bodies, embalmed with *Chenopodium* and *Ambrosioides*, wrapped in their habiliments, and placed in a sack made of rushes, and sitting in a circle, as if looking at each other. Each body had by its side some heads of maize, a vase of chicha, a bowl and spoon; and if it were a male, there were added a sling, club, in-

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Mr. Markham, in his *Peru and India*, informs us, that the shores of the Lake Umayu, near Vilque, appears to have been the burying-place of the chiefs of the Aymara tribes of the Collao; the ruins are at Silustani, which is covered with places of sepulture. Four of them are towers of finely-cut masonry, equal to that of Cuzco, with the sides of the stones dovetailing into each other. One of these was thirty-six feet high, with a cornice and vaulted roof, and a great lizard, carved in relief, on one of the stones near the base, which measured six feet by three. Besides these, the tableland is covered with other towers of rough, unhewn stone, and earth; and there are the remains of two square edifices, built of cyclopean stones. The considerable ruins of Ollantatambo, in 13° 15′ S. and about 72° 18′ W., consist of remains of a strong fortress, palace, walls, and terraces. All is remarkable here, mainly on account of the great size and the accuracy with which the stones are cut.

Osery, the companion of Castelnau, observed in the summit of a neighbouring mountain, a monument he supposed might be for astronomical purposes, namely, a square building, each side having three windows. One tradition is that a chief, named Ollanta, lived here. He fell in love with Cusi Collyur (joyful star), a daughter of the Inca Pachacutec. The Inca at first was very wrath, and made war upon him; but in the end Cusi Collyur became the wife of Ollanta. This love affair gave rise to a drama, performed before the later Incas, entitled, *Ollanta; or, the Severity of a Father and Generosity of a King*, composed in Quichua the beginning of the fourteenth century. Mr. Markham, in his *Peru and India*, 1862, says, the story of Ollanta was handed down by immemorial tradition, but that the drama was written by Dr. Valdez, the

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struments of the chase or for fishing. If a female, there was a basketful of balls of llama wool, or spines of the cactus, in lieu of needles, for knitting. When the tomb was full, the doorway was closed, but the window left open, so that the early rays of the sun could illume it; or the descendants could look in and contemplate the sleep of death of these now desiccated, parchment-looking bodies, the dull hollow places where bright eyes once shone, staring at the beholder.

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original manuscript being in the possession of Dr. N. Cuentas, of Tinta. In Markham's *Cuzco and Lima* are portions of the drama, translated into English; and Tschudi, in his work on the Quichua language, gives the whole of it in Quichua.

Old Huanaco is 9° 58′ S. and 75° 40′ W. Here are six stone portals, one inside the other, with slanting doorways, as well as other remains. There is a mound which may have been a look-out, or a place of sacrifice. We know nothing of the builders of these well-preserved monuments.

I will take Cieza de Leon's words as to the construction of the remarkable wells at Santa Elena, the tradition being that they were the work of giants who came upon the coast:—"They made a sort of village, and even now the sites of the houses are pointed out. They made deep wells, works that are truly worthy of remembrance; for such are their magnitude that they must have been executed by very strong men. They dug these wells in the living rock until they met with water, and then they lined them with masonry from top to bottom, in such a way that they will endure for ages."

The Chimus of Trujillo, on the coast of the Pacific, in 8° S. Their early history is obscure. Montesinos (not a good authority), says, that seventeen centuries before the Christian era, two comets appeared, which produced such a drought that the country, from 3° to 18° S., became a desert, when the greater portion of the people were destroyed. Afterwards, a strange people came by sea, landing first at Manta, and built at S. Elena; they were of great stature, and hideous, and called giants, or valiant Chimus. After a time, they were attacked by the people of the country, and had to retreat into the interior, but soon returned to the coast, and settled at Trujillo, the chief being called Chimu-Canchu (*canchu*, in Quichua, means an enclosure, or may be that the Chimus' city was enclosed by walls). Montesinos then goes on to say that the thirteenth ruler of Peru,—according to his list,—Huasca-Titu, died when about to make war on this nation. Garcilasso, a better authority, writes, that the ninth Inca, Pachacutec, sent an army of 30,000 men to conquer the Chimu-Canchu. The Chimus living in a dry climate had the foundations only of

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their temples, palaces, and principal habitations of rough stone, followed by large sun-dried bricks. Here are still to be seen the well-preserved ruins of two palaces and extensive walls, also some mounds, the tombs of chiefs; some of these have been opened, and considerable quantities of treasure, in gold and silver objects, have been extracted. In 1563 and in 1593, the King of Spain's fifth of what was found amounted to £61,000. After the conquest of the Chimus by the Incas, these latter introduced their style of architecture. At Pativilca, south of Trujillo, there are walls of Chimu construction. From the large quantity of pottery, objects in gold, silver, copper, bronze, and other things found in the tombs inland from Trujillo, as well as rude statuary, this region must have been well populated before and during Incarial times. On some of the pottery are paintings; one of which, a war deity, I have given at p. 203 of my *South American Antiquities*; the vase on which it is painted is in the British Museum.

Lambayeque, in 6° 40′ S. Balboa tells us, that from Lima to Piura was inhabited by Chimus, who came to the coast on rafts, bringing with them a green idol (probably of emerald) named Lampellec. B. de Bourbourg is inclined to give to the Peruvian coast nations a Nahuatl or Mexican origin, and lays, I think, too much stress upon a tradition, in Balboa, of the Naymlap who landed there, in the ninth century, with a "brilliant suite" of women and chiefs. The Incas gave the name of Yungas to the hot country of the coast, and the tribes about there have, in consequence, been called Yuncas.

Lima is in 12° S. This district, in early times, was ruled over by powerful chiefs, called Curysmancus, whose ancestors may have been the builders of the extensive city and temple subsequently called Pachacamac by the Inca conquerors. Some stone remains have been met with here, but the greater portion of the building material is of sun-dried brick. The great temple was on the summit of a hill, having three terraces; some of its walls were of unhewn blocks of stone, cased with sun-dried bricks, then covered with plaster, and in parts painted red. A range of pilasters projected from the upper wall, evidently belonging to the interior of a large

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apartment. After the conquest of this portion of coast by the later Incas, they built temples to the sun, and other habitations, in their manner, at this spot.

Cañete, south of Lima, and its country, had for chiefs the Chuqui-mancus; their style of building was similar to that of the Curysmancus. From objects I have examined, found in the tombs hereabouts, the people were not deficient in the useful arts.

Incarial. Before entering on the subject of the Incarial monuments, I will briefly allude to the probable origin of these builders. If we follow Garcilasso, we have the tradition that the first Inca, Manco Capac, and his sister-wife, were children of the sun and moon! sent to earth about A.D. 1000! My own impression is that Manco Capac came from one of the old Aymará nations, who dwelt about Lake Titicaca and its mountains; also, that the ancestors of the said Aymarás were the Collas, or mountaineers. If we take note of the very large number of Incarial buildings and their ponderous character, showing, also, at least two different styles of architecture; namely, firstly, the cyclopean, and secondly, the squared or wrought style, said to have been built from A.D. 1000 to 1530; I conceive the period of five hundred and thirty years is not sufficient, to build even the more modern works. Still, to simplify the subject, we will call the Manco Capac, of about A.D. 1000, the first Inca. Tradition tells us but little of previous Incarial dynasties worth notice.

I will just advert to the *Memorias Peruanas* of Montesinos, lately brought to light. His *Anales Peruanas* are still in manuscript. Montesinos, who must be followed with great caution, held high office in Peru, visiting the country a hundred years after the conquest. His list of Peruvian rulers amounts to one hundred and one. He begins his chronology of the country five hundred years after the Deluge, and his ninetieth monarch is the first he calls Inca; and says of him that his mother, Ciboca, by artifice raised to the throne her son Rocca, so handsome and brave that he was called Inca. This Rocca is the Manco Capac of Garcilasso. However, if we add some of the rulers of Peru from Montesinos' list to

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that of Garcilasso's, which contain only thirteen or fourteen, we may then account for the builders of the Incarial monuments. Generally speaking, the formation of those wonderful roads in Peru has been awarded to the Incas; still, I consider that before their times many were in existence, but extended by the Incas. Some of these roads were in and over the Andes, with resting-places of stone; others to and by the coast, occasionally with walls on each side, whilst in parts they were shaded by trees. The upper road from Cuzco to Quito was from eighteen to twenty feet wide, and 1,200 miles in length; the lower road was wider, and 1,600 miles in length. Small stone bridges were known to the Peruvians, but without the arch; the swinging or suspension bridges of ropes were brought to perfection by them. Their aqueducts were bold pieces of work; one ordered to be made by the Inca, Viracocha, is reported to have been 450 miles in length; it went along the steepest sierras, through tunnels, nourishing the *andeneria*,* or terraced gardens and lands.

The extent of their quarries prove as to the quantity of building which has been carried on; and when we consider they had no tools of iron, or powder to blast the rock, the manual labour must have been immense.† Their principal buildings were fortresses, temples to the sun, and as to royal residences, it is affirmed that there were more than two hundred between Cuzco and Quito. The ruins which still exist of palaces, temples, houses of the virgins of the sun, schools, the

* From the Spanish *Andenes*, or steps, from which comes Andes, and not from the Quichuan word *anta*, copper; or the *Antis* Indians.

† Near Andajes (Cuzco), and on the right bank of the Huilcamayo, in the centre of the mountains, can be seen a huge collection of very large and well worked stones. The mountains are full of square excavations, whence these blocks have been extracted. Here the Incas' prisoners worked. There is another locality hard by, known as the Devil's Chair; this is composed of blocks of rocks in front of the mountains, in which are seen many quarries. Some of these sort of blocks would be taken to Cuzco, and are now seen composing cyclopean walls and buildings. Near the Devil's Chair is a quarry of porphyry, from which huge stones have been taken; but the workmen, instead of leaving the spot strewed with rocks, and irregular, have formed it into an admirable monolith chamber of about thirty-three square feet, containing three long seats.—*Tour du Monde*, No. 172, 1863.

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great fortress, and other remains, at Cuzco, the capital of the Incas, bear witness to great merit in a peculiar and ponderous style of architecture. The earlier, I conceive to have been cyclopean; then follow square and oblong building masses of granite, porphyry, and other stone; in some few instances wrought stone, in a spherical form, is seen. The lintel is generally narrower than the threshold, like the Etruscan; and their architecture was characterised by simplicity, symmetry, and solidity. With regard to the cyclopean form, some of the stones were of large size, having more than twelve angles, which fitted in so closely to the other stones that a penknife can scarcely be introduced at the junctures. The principal Incarial ruins in Cuzco are the following:—

1. The Great Temple of the Sun, on the ruins of which is built the church of Santo Domingo.*

2. The Sacsahuaman; or great fortress, which took fifty years to erect.

3. Colcampata, the palace of Manco-Capac; where may be seen the figure of the so called "Mermaid."†

* In No. 173, 1863, of *Le Tour du Monde*, is the following relative to the Temple of the Sun at Cuzco:—"For a long period the Temple of the Sun was merely an enclosure (a *chimpu*), constructed of brute stones, in the centre of which was a square altar." In the drawing, at p. 257, the front does not appear; the two side walls are double, that is, there is a passage between them; at the back is a wall; all is of cyclopean construction. At the back or end, on a long altar, is a large image of the sun. On each of the sides are ranged, on seats, five Incas, and one in the centre, making eleven in all. It is thatched with straw.

† Vigne, ii, 77. "In the upper part of the city, under the Rodadero, are the remains of the palace of Manco-Capac, consisting of a wall eighty yards in length, of smaller but irregularly-shaped stones, placed just as they happened to fit in, but more regularly round the niches, of which there are seven, at equal intervals, less than a foot in depth, and sloped like a perpendicular slice of a truncated cone. The upper wall, in which these occur, is about ten feet high. Beneath one of them, on the basement wall, projecting in advance of the upper one, is a curious figure, *in relievo*, of a mermaid* with a fish's tail, about a yard high, in a niche shaped like the others. It much resembles the mermaid-like figures on one of the Carthaginian mosaics in the British Museum."

* In vol. i, p. 368, Mr. Vigne speaks of a fish, from Lake Titicaca, he calls "*humento*, about ten inches long, nearly one-half occupied by the head. It

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4. Palace of Inca Rocca.

5. Ab Uahuan, habitations of the Virgins of Sun.

6, 7. Palaces of the Incas Yupanqui and Huasca.

8. Cyclopean constructions in the square of the sun, or Intipampa.

9. Ruins of the Gardens of the Temple of the Sun.

10. Coricancha; or Square of the Sun.

11. Yacha-huasi; or schools.

There are four figures, in relief, on large slabs, in a house once occupied by the Inca Garcilasso de la Vega; on the two upper slabs are the figures sometimes called the "Sphinx-Griffin," heads of women, and bodies of birds; on the lower slabs are the "Serpientes," with scales, and long tails coiled up behind their backs.*

The end walls of the buildings were pierced with small square openings to serve as windows; the thatch was generally of *ichu* grass; the interiors consisted of spacious halls, with small rooms adjoining, the walls of which were adorned with figures, in gold and silver, of deities, animals, and flowers; mirrors of hard polished stone and metal hung on stone pegs; whilst in recesses were their household and other gods, in gold, silver, copper, and clay. The couches were of Vicuña cloth, and the *tianas*, or seats of the Incas, were covered with gold.

The temple at Cacha, on the banks of the Vilcamayu, built by Viracocha, is described as having been very beautiful; it was square, with a portal on each side, and in the centre was

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was brought to table dressed in paper, like red mullet, and is scarcely inferior to that fish in flavour." I do not think the fish was called "humento"; but the mode of cooking it in paper, when practised, is called "umita". This so-called mermaid is merely a fish from Lake Titicaca and some of the Andean rivers, and may have been in some way deified by the Peruvians.

* Vigne (ii, 76), says, "In the Calle del Triunfo are the *relievos* of the Sphinx-griffin (birds with female heads) breed, known as *Las Serpientes* (serpents with feet), each about a yard in height; and there is also a wall in which are some memento stones; one of them has twelve sides of irregular length, and measures, on the exposed side, about fourteen feet six inches in length, being in fact the *piedra grande*, in the house of that name, mentioned by Garcilasso."

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the statue of a spirit in long flowing robes, leading a strange animal by a chain.

Mr. Markham tells us, that some of the ruins on the islands in Lake Titicaca are old Aymará, but there are others which are Incarial. The Island of Coati was dedicated to the moon, the name being derived from *coyata*, the accusative of *coya*, a queen,—the moon ranking as wife to the sun. The ruins of the house of the Virgins of the Sun, on Coati island, are 120 feet long, the interior being divided into numerous cells, with rows of niches in the walls. The interesting astronomical acquirements of the Peruvians, including their calendar, have been fully detailed in my account of "The Astronomy of the Red Man," in vol. i, *Memoirs of the Anthropological Society*.

Independent of this list of Inca ruins, there are others at Cajamarca, the second city of the empire, built by later Incas, in all probability on the ruins of a Chimu city. The approach to Cajamarca from the coast was guarded by fortresses of masonry. The Spanish conquerors describe the city, with its white habitations glittering in the sun, like a sparkling gem on the dark skirts of the Cordillera. It was three miles in length, and contained 10,000 people; the houses were generally built of clay hardened in the sun, the roofs thatched or with timber. There were some buildings of hewn stone. The Inca Atahualpa's quarters were an open courtyard; a light building with galleries was around it; the walls were covered with white and red shining plates; and before the edifice was a bath, filled with hot and cold water. There is still to be seen a large stone edifice with a serpent sculptured on its walls. The Inca's residence was built of large sun-dried bricks; only one apartment of which now remains, twelve yards long by eight wide, and where Atahualpa was imprisoned. Until lately could be seen the mark the Inca made on the wall, of the height that treasure should be piled for his liberation.

At the time of the conquest, Astopilca was the *curaca* (not *cacique*), or governor; it was in his residence that Atahualpa was confined. In the chapel of the present prison at Cajamarca is an altar, built over the stone upon which the last of

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the Incas was strangled, and under which he was buried. Near the fountain in the plaza is seen the foundation of stone for the little battery, built by Pizarro, and in front of which Valverde uttered his theological harangue to the Inca. Fifteen miles from Cajamarca is Jesus, the remains of a large Indian town, capable of holding five thousand families, and may have been the residence of the Chimu of Chicama, before he became the vassal of the Inca Pacacutec.

The rapacious Spanish invaders have almost destroyed a population, in Peru, of nearly eight millions of people. They robbed the temples and tombs, polluted their altars, and committed every species of enormity on an unoffending race. We have sketches and plans of some of the Peruvian monuments, but these have not their full architectural value, as few are to scale; however, let us hope that the period is not far distant when the monuments I have referred to, throughout the New World, will be carefully examined and described, and that we may be favoured with views of them by means of the heliograph.

Resumé.—As we find about the same general arrangement of rocks in the New World as in the Old, it is natural to conclude that the continent of America bears an equally ancient date, and has gone through analogous changes. The Old World, however, has its greatest length from east to west, the New, north and south, and the great mountain ranges take opposite directions. The fossil remains have great peculiarities; and the vegetable and animal creations of America have very marked differences when compared with similar creations in other portions of the globe. Plants and animals, it is generally considered, were created antecedently to man; and when we examine the distribution of humanity in what is known as the New World, and compare it with what is met with elsewhere, we discover differences of such a character as to give the idea that the red or copper-coloured man of America came from other than the one pair of the monogenists.

I have estimated the native population of America, at the period of its discovery, at over 100,000,000; at present there may be from 10 to 11,000,000. They are said to have some

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four hundred languages and over two thousand dialects. This is a curious phenomenon, and worthy the attention of philologists, the more particularly as to the *time* that has been required for their invention. It has been observed, that a multiplicity of languages and dialects in a country is a proof of barbarism. As regards the New World, is this barbarism the original one, or the consequence of the breaking up and dispersion of large nations through wars, or otherwise? As to the origin of language, one learned man says, that language is a natural faculty, swiftly developed by a powerful instinct, the result of intelligence and human freedom, which have no place in purely organic functions. Another, that language is the living product of the whole inner man. Grimm holds it to be essentially human; it owes to our full liberty both its origin and its progress. W. von Humboldt's idea is, that language is not a gift bestowed, ready-made, on man, but something subjectively emanating from himself. The old opinions were,—1. That language was innate and organic. 2. That it was the result partly of imitation and partly of convention. 3. That it was revealed.

With the adaptation of language to man's wants, he had to invent numbers, pictography, and writing. The languages of America are peculiar to it. Pictorial, figurative, symbolic, and hieroglyphic, delineations have been found; the cartouches on the ruins, particularly in Central America, may be soon partially explained by the alphabet preserved by Landa. I have already mentioned, when speaking of Yucatan, the recent discovery of a peculiar species of hieroglyphic alphabet, which Bishop Landa has handed down to us. Then as to numbers, they were of the simplest forms, as dots, circles, ovals, and lines, as in Mexico; but in Peru, for this purpose, the *quipu*, or knotted, coloured strings, were used.

In the first page of these observations, I have supposed the Indian of America to be a separate creation from the rest of mankind. I will now make a few remarks on some of the other great groups of men. First, the East Indian, composed of more than thirty nations, each with a distinct language and endless dialects; to these may be allied the Mongolian

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Tartar, Chinese, and Japanese. Linguistically the monosyllabic Chinese races, compared with the Indian, are widely distinct. The East Indian and Mongol are brown, with straight and sometimes wavy black hair. The Chinese and Japanese are yellowish, and have black hair. Could the islands of the Pacific, including New Zealand, have been peopled from Asia? for in all these places, we have still a brown and dark race, with black but not woolly hair; or are they remnants of separate creations?

In New Guinea and in Australia there is found a Negro type (not the African Negro) which is distinct from the light-brown races of New Zealand and Fiji. Then we have the natives of the Andaman islands, who we are told have some few characteristics of the Negro; but there is rather the chance of their being a remnant of some very old race. The monogenists suppose that the cradle of the human race was situated *somewhere!* extending from the Indus in the east to the Nile on the west, and a good part of Africa, containing the countries now known as Cabul, Persia, Arabia, Abyssinia, and Egypt; that Shem was the progenitor of the Asiatics; Japhet of the Europeans; and Ham, or his son Cush, was the founder of the African Negro.

Long previous to and since historic times, the brown man has occupied Asia. If we follow a north-west direction from the supposed cradle of the human race, we reach Britain, the farthest western boundary of the white species,—I do not take Iceland and Greenland in here, Europe being at present composed of the Teutonic in the north-west, the Celtic, Græco-Latin in the south, and the Sclavonian in the east. Diverging from the aforesaid centre in an east-north-east and south-east direction, even as far as New Zealand, brown races exist, some so much darker than others as to be called black; but go south-west to Africa, there you have the true Negro black, and with real woolly hair, also a brownish black and yellow-brown race; but none of these offer similar characteristics with the red- or copper-coloured man of America, the Asiatic, and less with the white European. If we go to the north and then to the east we find the Tartar people are of various shades of

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brown until we reach the Tschouktch, who link on to the Esquimaux, these most probably of Asiatic origin. A brown (but it was not a copper-coloured people) might have got to the New World, say by Behring's Straits, but we have not found any remnant of a brown or Asiatic race in the New World, or any other remains, save those of the New World man. I may mention, that at the period of the discovery of America by Columbus, the following was about the form of government existing there.

North America was composed of Confederacies, say republican oligarchies; the Natchez, with a theocratic element added. Mexico and Central America, principally theocratic monarchies. Bogotá had a monarchy, and a pontiff ruling his own state. Quito, under the Scyris, a monarchy. Peru, a theocratic and monarchical arrangement. In the West Indies, Amazonia, Brazil, the Pampas, Patagonia, and Arauco; the populations were tribal, and under chiefs.

With regard to the antiquity of man in the New World, we have first to notice the probably recent fossil-men of Guadaloupe in the West Indies. Ancient human remains have been met with in the coral reefs of Florida. Lyell says, "If I was right in calculating that the present delta of the Mississippi has required, as a minimum of time, more than one hundred thousand years for its growth, it would follow, if the claims of the Natchez man (found buried under four cypress forests) to have coexisted with the mastodon in North America are admitted, that North America was peopled more than thousands of centuries ago by the human race." Dr. Lund found human skeletons in the caves of Brazil, with fossil bones of animals, the appearances of which induced him to believe that the Indian had existed during a vast lapse of time in South America. Darwin observes, that "we must admit that man has inhabited South America for an immensely long period, inasmuch as any change in climate, effected by the elevation of the land, must have been extremely gradual."

In a paper of mine in the Ethnological Society's *Transactions* for 1863, alluded to in the Ecuador section, I gave an account of some ancient pottery lately sent to me from the

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north coast of Ecuador, with the information that it had been submerged, for an unknown time, under the sea, and then the land there brought to the surface again. This pottery is in the British Museum. We may as well make up our minds to the view that we know nothing, even approximately, how long humanity has existed on our planet. Amongst unbiblical writers of the present day, a margin is given from 35,000 to 9,000,000 years.

Some years since, having collected and examined materials concerning the history of America, particularly as to the architecture of ancient Mexico, Central America, New Granada, and Peru, the languages spoken there, the arts, and allow me to say science, I first came to the conclusion that, in the regions above mentioned, the nations occupying portions, each showed a civilisation of its own; and that other localities in those lands supported tribes, and even nations, as mere hunters in the wilderness. This interesting branch of study shadowed forth to me that the Red Man, of the New World, showed that he was rather a distinct species, or creation, when compared with the white man of Europe, the brown of India, the black of Africa, and other groups of men. However, as we are early taught by historians, theologians, and writers on natural history, the absolute propriety of a belief in the unity arangement in regard to mankind, it required some courage even to ponder on a plurality of origins.

With regard to the natives of the New World, he has been well called the Red Man. If we investigate him, however cursorily, physically, mentally, and morally, we find that special laws govern him. He has his own climate, his own aliment; his own diseases, which he knows how to alleviate and cure; but let him contract any of the European maladies, the majority (especially smallpox) are fatal to him, even to the annihilation of whole nations. If we examine him by crania and its contents, we find, at least in the conformation of the brain as compared to the European, a marked difference. On this point I cannot do better than refer to Dr. Nott's researches in *Types of Mankind*, wherein are drawings of two casts from nature; one the brain of an American Indian; the other, the

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brain of a European. In the Indian, the anterior lobe is small, and in the European it is large in proportion to the middle lobe. In the Indian, the posterior lobe is much smaller than in the European. In the American Indian, the cerebral convolutions on the anterior lobe and upper surface of the brain are smaller than in the European. Differences are also observed in the osteological characteristics when compared with the white man. As to the physiological, from what I have seen and have been able to collect in America,—the more particularly as regards the mixture of the European with the Indian giving rise to the Mestizo, the European with the Negress forming the Mulatto, and the mixture of the Negro and Indian forming the Zambo, and their breeding *in and in*,—the result does not appear to me to be of a prolific nature, or satisfactory either physically, mentally, or morally.

In early times this was attributed, in regard to the native women of America, to "an original *defect* of organisation, or some mysterious cause." There is no defect or mystery when we have to treat of the white, brown, red, black, and other great groups of mankind; but it is when they mix one with the other, giving rise, as I conceive, to more varieties, that the said defect or defects show themselves; and it is mainly this state of things that would lead one to lay aside the monogenistic for the polygenistic view, and suppose that the white, brown, red, black, and may be, some other families of mankind, are original species; and that Mestizoes, Mulattoes, and Zamboes, are varieties, capable only for a limited time to be prolific, whilst the pure species would be as persistent as ever. Exact details of crania, the brain, skeleton, and especially the examination of the organs of generation, etc., of what I call species and varieties, must be left to the giants of physiological science, and that great differences will be found I have no doubt.

Paul Broca, *Recherches sur l'Hybridité Animale*, etc., Paris, 1860, p. 621, observes:—"Un des caractères de la race éthiopique réside dans la longueur du membre génital comparé à celui de la race caucasique. Cette dimension coïncide avec le longueur du canal utérine chez la femme éthiopienne, et l'une et l'autre ont leur cause dans la conformation du bassin chez le nègre.

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"Or il résulte de cette disposition physique que l'union de l'homme caucasique avec la femme éthiopienne est facile et sans nul inconvénient pour cette dernière. Il n'en est pas de même de celle de l'éthiopien avec la femme caucasique; la femme souffre dans cet acte, le col de l'utérus est pressé contre le sacrum, de sorte que l'acte de la réproduction n'est pas seulement douloureux, il est plus souvent inféconde."

But this is not all. As they are likely to be of different species or creations, so will there be differences in every particular; and it is this that prompts me to class humanity thus:—

Genus.—Man.

Species.—White, yellow, brown, red, black, etc.

Races.—As the white species gives its comparatively pure and mixed races, so will the other species.

Varieties or *In-mixed Breeds.*—As the White with Black, forming the Mulatto. White with Indian, forming the Mestizo. Indian with Negro, forming the Zambo; and thus, *ad libitum*, giving rise ultimately to unprolific sub-varieties.

If we look at the mental doings in the New World in regard to religion, language, numbers, pictorial writing, and even the invention of a hieroglyphic alphabet, also to the architectural, we find these peculiar to each of the several great nations; as also in their computation of time, and the beautiful invention of their various calendars and zodiacs. It has struck me that what we commonly call the semi-civilisation of the people of America, should rather be denominated their own civilisation.

I come now to a very serious question, namely, whether the Red Man could have gone much further in knowledge had he been left to himself, seeing that he has acquired so little of the civilisation of the white man? With such an impression, I classify humanity in the scale of intellectuality thus:—1. White. 2. The Oriental. 3. The Red Man. 4. The Negro, etc.

I have only to add, that my humble inquiries into the subject of species and varieties lead me to abandon the unity, or monogenistic view, for the plurality or polygenistic, or that of separate creations.

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XI.—*On the Psychical Characteristics of the English People.*

By L. Owen Pike, M.A., F.A.S.L.

Contents.—Prefatory remarks.—Connexion between the Ancient Britons and Ancient Greeks.—Necessity for a good division and classification of Psychical Phenomena—That of Professor Bain the simplest, and therefore best adapted to our purpose.—The athletic character of the English; their extraordinary Will and Energy traceable to a pre-Teutonic rather than to a Teutonic source.—Manifestation of the same characteristics by the Ancient Greeks.—Wonder, the characteristic emotion of the Germans, not of the English.—The sense of decency in England and abroad.—Patriotism in the English and in foreigners.—Connexion of the Druidic Philosophy with Greek Philosophy.—Eloquence of Britons, Greeks, and English.—Constructive Power in the Britons, Greeks, Germans, and English, as shown in mechanical skill and inventions; in the Drama, in Architecture, in Music, and in Painting.—The power of detecting hidden resemblances, and the power of retaining impressions, as shown especially in the Poetry, the Philosophy, and the Science of Greece, Germany, and England.—Certain moral characteristics corresponding to the intellectual characteristics.—General agreement of the Greek character with the English, and with what is known of the Ancient British character.

"Ἡ γλῶσσ' ὁμώμοχ' ἡ δὲ φρὴν ἀνώμοτος."

Euripides.

As some of the opinions here set forth are directly opposed to those which are commonly held, it may be well to state, by way of preface, that this paper is only a portion of a larger work, *The English, and their Origin*. In that work the historical evidence, the philological evidence, and the evidence of physical characteristics, are all discussed at some length. An attempt is there made to show that there is no historical evidence which can prove the English to be mainly of Teutonic origin; that the philological evidence can prove no more than a Teutonic influence, and cannot afford us the means of estimating the proportions of the different elements in our

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blood; and that it is impossible to account for our physical and psychical characteristics on the assumption that our forefathers were Germans, or even half Germans.

It is there also pointed out, that there are very remarkable coincidences in the Greek and Cymric languages. But though I have availed myself of certain indications afforded by the Welsh, or Cymric language, it must not therefore be supposed that I regard the Welsh as the best representatives of the people or peoples who were called Britons, and who may have been in great part our ancestors. Causes similar to those which imposed the Latin language upon the Gauls, may have imposed a High Celtic dialect upon a race in which possibly High Celtic blood does not predominate. I take the Welsh language as affording evidence merely that a certain type of language existed in our island before the Roman invasion. And though the coincidences in the Greek and Welsh languages tell of something more than only a common Aryan origin of those languages, they may be, I am willing to admit, worth nothing as evidence of blood, but they suggest further inquiry. And upon inquiry it is found that many traditions, some scraps of history, and the physical and psychical characteristics of ancient Greeks and ancient Britons, seem to point in the same direction. Hence it is that in the present paper frequent reference is made to the ancient Greeks. If there existed a common non-Teutonic element in the ancient Britons and the ancient Greeks, we may gain information by comparing the English character with the Greek, in those cases in which it is impossible to compare it with the British. The ancient Greeks attained a degree of civilisation intermediate between that of the ancient Britons and that of the modern English; and if we can detect the childhood, as it were, of the English intellect in the intellect of the Greeks, and the infancy of the Greek intellect in the intellect of the Britons, we may infer that in proportion as the English intellect approaches the Greek, it also approaches the British.

A systematic comparison of the psychical characteristics of different nations is a task of such difficulty that anyone who

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attempts it may reasonably claim some indulgence for his shortcomings. An attempt to make such a comparison leads us into a field which has hitherto been almost untrodden. A few hasty generalisations about the impulsiveness of the Celt and the steadiness of the Teuton; a dogma or two on the subject of art from some critics who assume infallibility in matters of taste; and a compliment from each particular author to his own nationality or his own particular province, may be considered the sum total of all that has been written on the subject. This meagreness in a branch of Anthropology, which is perhaps of all the most important, is due probably to the unsatisfactory state in which psychology has remained for ages, and to the facility which, as a necessary consequence, exists of exaggerating the importance of any salient feature—of seeing a salient feature where none has been planted by nature. Different psychologists have given different divisions and different subdivisions of the mind; and of those writers who have glanced at the mental peculiarities of different nations, some have adopted one division, some another, some apparently no division at all. No wonder, then, if statements directly opposed to each other, are found in works written by authors of repute,—no wonder if the whole question is in the greatest confusion.

The first object of search, in the consideration of psychical characteristics, is a satisfactsry division and classification of mental phenomena. When this is obtained, one source, at least, of error is cut off. And of all divisions and classifications of the mind which have yet been made, Professor Bain's is perhaps the best. It may be admitted that even this division is open to some objections; but it is open to fewer objections than any other, and it will in the main be adopted in the present investigation. It will be necessary to state briefly the leading principles.

The primary division is fourfold: into the Senses, the Intellect, the Emotions, and the Will. Before dealing with the Senses, however, Professor Bain assigns to the muscular feelings a province of their own, principally because he is anxious to establish a theory of "spontaneous activity," which it is not

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necessary to discuss here. There may, however, be suggested another reason for considering the muscular feelings and movements as a distinct branch of inquiry, and that is their very great importance as an index to character and disposition.*

The intellect is treated by Mr. Bain under three different heads:—(1.) The power of retaining and reviving past impressions, the various component parts of which are associated when revived, as they were associated when first received. (2.) The power of perceiving resemblances,—of recalling past impressions by the aid of present impressions, which have some point or points of resemblance to those past impressions. (3.) The power of original construction,—of combination.

To use Professor Bain's own words, we have, first, the "Law of Contiguity or Redintegration:" "Actions, sensations, and states of feeling, occurring together or in close succession, tend to grow together, or cohere, in such a way that when any one of them is afterwards presented to the mind, the others are apt to be brought up in idea."† We have, secondly, the "Law of Similarity:" "*Present* actions, sensations, thoughts, or emotions, tend to revive their LIKE among *previous* impressions or states."‡ We have, thirdly, the principle of "Constructive Association:" "By means of association, the mind has the power to form combinations or aggregates different from any that have been presented to it in the course of experience.§

Great observers and collectors of facts are strong in the element of contiguity. Great thinkers—men who generalise and discover laws—are strong in the element of similarity. Great inventors are strong in the element of constructive association; such men are poets, painters, musical composers, inventors in the arts and sciences.

Under the head of similarity fall the reasoning processes, to which have been given the names of generalisation, abstraction, induction, deduction, etc.

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* See an essay by the author on *Physical Education*. Longman: 1863.

† *The Senses and the Intellect*, 2nd edit., p. 332.

‡ *Ib.*, p. 463.

§ *Ib.* p. 585.

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The great value of this division consists, above all, in its simplicity; it enables us to class together mental operations which appear at first sight quite distinct, but are really almost identical, or have at least certain elements in common. It renders possible what, without such a division, is impossible,—the comparison, in different nations, of mental qualities which are in fact identical, though they are seen in different aspects. This will be shown as the argument advances.

It is not necessary to say much of Professor Bain's treatment of the Emotions and the Will, though reference will occasionally be made to it; it is to his work on the *Senses and the Intellect* that I am most indebted, and especially to his subdivisions of the intellect.

In treating of the living, acting, feeling, thinking human being, it will perhaps be best to begin with the simplest manifestations of disposition,—with those which there will be least difficulty in identifying in the different nations compared.

It may be considered somewhat bold to assert that the athletic characteristics of the English people may be traced to a Celtic* rather than a Saxon source. It is a common belief that the Saxon is the greatest athlete; the strength and endurance of the "Anglo-Saxon race" are proverbial; and the "Anglo-Saxon" race is always spoken of as Teutonic. Let us now consider calmly what is the evidence in favour of this theory.

And let us first consider what are the principal forms in which the athletic power of the English displays itself. The English and Irish are probably the best horsemen in the world; it would be difficult even to discover in any continental language an equivalent for "across country"; and when foreign nations adopt our national sport of horse-racing, the horses are almost without exception of English pedigree, the jockeys of English or Irish birth. Cricket is a game which is essentially English, though it is not unknown in Ireland. The English are again the best oarsmen in the world, whether amateurs or professed watermen. A race between an English

* By the term Celtic I mean no more than pre-Roman.

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crew and a foreign crew almost invariably leaves the latter nowhere. Skating is a pastime which we share with the French, the Dutch, the Germans, and others; but although the opportunities for practice are far inferior in England to those which are enjoyed by the other nations, it is not too much to say that in England* the art has attained its highest perfection. A Dutchman may attain extraordinary speed, and a Frenchman may accomplish wonderful *tours de force* with the knees bent, but it is the Englishman who, *par excellence*, attains that perfect command over all his movements, which is shown by the deliberate *three*, the straight leg, and the wide sweep. It is England which is famous for her prize-ring; and the English are great wrestlers, too; for the prize-fighter must be prepared to "close" and to be closed with. And in addition to all this, the Gymnasium and the School of Arms are not unknown amongst us. It is, then, not without reason that we are considered an athletic people. The great variety of our athletic sports may certainly be considered to carry away the palm, notwithstanding the sword-practice of France and Italy, and the gymnastic feats of the Germans.

Too little is known of the manners and customs of the Ancient Britons to enable us to bring direct testimony that they were a remarkably athletic people; nor, on the other hand, are we able to assert or deny, from direct testimony, that the Germans were an athletic people.† But there exists, nevertheless, evidence to shew whence our athletic spirit is sprung. The evidence of philology, though it is frequently of little value, is sometimes sufficient to establish a particular point beyond all dispute. I have elsewhere remarked that the Welsh word *ym-afael* contains the same root as the Greek *πάλη* (wrestling), *ym* having a signification nearly equivalent to the Greek *σύν* or *ἅμα*; *ymafael* is in fact equivalent to *συμπάλαισμα* or *ἀμαπάλη*.‡ It is certainly little short of the

* *Id est*, so far as European countries are concerned. It is possible that even the English may be excelled by the Canadians.

† It must be remembered that "athletic" and "warlike" are not synonymous terms; the athlete may be and commonly is simply a sportsman.

‡ Compounds not actually met with.

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marvellous that in two languages in which even the names of the metals are different, the name of an athletic sport has remained the same; we might almost be inclined to conjecture that the sport and the language were common to Greeks and Britons before either knew the use of the metals, perhaps long before either were called Britons or Greeks. And it is very curious that wrestling was one of the athletic sports in which the Greeks most excelled, and in which the English—especially the Cornish men—most excel at the present day.

Language will not equally enable us to trace the use of the fists to the Ancient Britons; but, bearing in mind the connexion which has been pointed out between the Britons and the Greeks, we may reasonably suspect a British origin for a custom which has been honoured among the Greeks and the English, and is in disrepute among the Germans. There is a savour of slang about the Homeric expression πὺξ ἀγαθός, which could not even be rendered into French or German, but which the editor of *Bell's Life* would have no difficulty in translating "a good one with the mawleys."

But while there is hardly any evidence that the use of the fists is of Teutonic origin, or is in any way congenial to the Teutonic character, the suspicion that the custom is of Celtic origin is at once confirmed by a reference to the annals of the ring.* It is unfortunate that the birth-places of the prize-fighters have not been made known in the majority of instances. But the birth-places of more than seven hundred are known, and the evidence afforded by them is not only quite consistent with a Celtic origin of the custom, but is quite inconsistent with a Teutonic origin. It is obvious that if any portion of South Britain was thoroughly Teutonised by the Anglo-Saxon invaders, it must have been that which lies nearest to the eastern coast; and if the love of fighting with the fists (which is always considered peculiarly English) be really an Anglo-Saxon characteristic, it is obvious that the majority of the prize-fighters should be natives of the eastern-most part of the island, while few, if any, should come from

* *Fistiana*, 1865, and the *Illustrated Boxiana*.

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the west. But what are the facts? Of all the counties on the eastern and south-eastern coasts there are only two which produce even a moderate number of pugilists. Of these two, that which produces the larger number (fifty-seven) is Yorkshire, a county which, though extending on one side to the eastern coast, extends on the other more than three-quarters of the distance to the western coast. And the largest contributions, to the total of fifty-seven, are made by the towns of Sheffield and Leeds, which send respectively seventeen and fourteen. Both these towns lie about half-way between the easternmost and westernmost extremities of the county. With the exception of ten contributed by Hull, the remainder of the Yorkshire fighters, whose birth-places are known, come from the manufacturing towns of the west. Norfolk is the only other county on the eastern and south-eastern coasts which boasts a larger number than nine; and of the eighteen Norfolk prize-fighters fourteen are Norwich men, one a Lynn man, and one a Yarmouth man; from which facts it may be conjectured that the men who make voyages to those places and to Hull bring with them some blood of which the elements are not in the same proportions as in the natives of the coast.

But the great bulk of the English fighting-men come from the western and midland districts. Lancashire contributes ninety-two; Staffordshire, sixty-six; Warwickshire, one hundred and eighteen; Somerset twenty-seven, and Notts twenty-two. The metropolitan counties—Middlesex, Surrey, Essex, and Kent—which may, perhaps, be fairly considered to represent the whole nation, contribute one hundred and five, while Birmingham alone boasts one hundred and three.

But it must not be forgotten that other causes besides difference of blood may have some influence in causing the difference between different districts. It appears that, even in the same county, the great manufacturing towns produce large numbers of prize-fighters, while the county towns and the agricultural districts produce few or none. Manchester, for instance, produces thirty-two, while Lancaster produces only one, Walsall twenty-two, and Stafford none, Birmingham one hundred and three, and Warwick none. But

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what connexion, it may be asked, can exist between manufactures and prize-fighting? The answer is probably to be found in the following considerations: firstly, where large bodies of men congregate there is a greater probability of quarrels than in thinly peopled districts; secondly, that portion of the population which possesses the greatest energy and vitality is most likely to seek its fortunes in the manufacturing centres where most money is to be made; and, lastly, there is a very considerable immigration of Irish into all the manufacturing towns. It is indeed probable that there are, and have been, quite as many fighters of Irish as of English blood; for, although this is not apparent from the direct information given in *Fistiana*, the names of the pugilists indicate that, in many instances, they are of Irish descent, if not of Irish birth.

Whether the use of the fists be a good thing or not, no one will deny that it is characteristically English; and the evidence which has now been given, meagre* though it certainly is, shows, I venture to believe, with more clearness than is generally to be obtained in anthropological matters, that at least

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* In a paper read by the late Professor J. D. Forbes before the Royal Society of Edinburgh, and afterwards printed in Smibert's translation of Quêtelet *Sur l'Homme* (p. 114), some figures are given which, as far as they go, seem also to indicate that the infusion of Saxon blood into British veins has decreased rather than increased the original vigour of the Celt, though not to any very great extent. But M. Quêtelet, who was the first great experimenter with the dynamometer, has pointed out in his work *Sur l'Homme* that unless the utmost care is used, the results cannot be relied on, and that different observers arrive at totally different conclusions. It must be remembered, too, that Forbes made experiments only on 178 English, 523 Scotch, and 72 Irish, of all ages, between 14 and 25, and that therefore the average numbers at each age would be (fractions apart) 15 English, 44 Scotch, and 6 Irish; and as the results are not the same at all ages, it is clear that the result for the age of 25, on which Forbes places most reliance, and which has been most frequently quoted, is of no very great scientific value. Forbes accepted Quêtelet's numbers for the Belgians, and the very great apparent difference between their strength and that of the English, Scotch, and Irish, is probably owing chiefly to a different method of using the dynamometer. It is nevertheless curious that Forbes's numbers confirm the conclusion arrived at from my analysis of *Fistiana*.

	English.	Scotch.	Irish.	Belgians.
Strength in pounds at the age of 25, according to Regnier's dynamometer	403	423	432	339

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one marked feature of the English character is to be traced to a pre-Teutonic origin. Still more evidence, indirect though it be, may be found in the fact that the Greeks, like the English, were great oarsmen; and nothing, perhaps, can give us a better idea of the Athenian character than the sudden change of feeling which decreed life to a number of human beings who were condemned to death, and nerved a gallant crew to exertions almost more than human in behalf of captive foes.*

But, above all, the Greeks were celebrated, just as the English are celebrated for their horse-racing; and here again is a connecting link between the Greeks and the Britons. The Greeks had not what we understand by horse-races, but chariot races, which probably owed their origin to the ancient custom of fighting from chariots. This custom, common to the Greeks with many Eastern nations, was shared also by the Britons, and apparently, among western nations, only by the Britons. Just as there was a type of language common to Greeks and Britons, there was a mode of warfare common to both; and in the latter case at least the similarity does not appear to have been shared by the nations lying between Britain and Greece.

But there is direct evidence to show that even in the time of the Romans, Britain was a great hunting country. The chase of the boar has now, it is true, given place to the chase of the fox—a fact in itself significant of the pertinacious spirit of British huntsmen. But modern coursing and stag-hunting seem to be the lineal descendants of ancient British sports. Mr. Wright, who has been indefatigable in this field of inquiry, has called attention† to the evidence that boar-hunting was a common sport in the Roman period; he has shown that hunting scenes are commonly depicted on the pottery of that period, the hare or the stag being generally the victim; he

* All the adult male inhabitants of Mitylene were condemned to death on the motion of the demagogue Cleon; and when the revulsion of feeling came to pass, the vessel which carried the cruel sentence had already been a day out. The second vessel arrived just soon enough to stay the execution.

† *The Celt, the Roman, and the Saxon*, p. 210.

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has pointed out the ancestors of our English bull-dogs, mastiffs, greyhounds, and stag-hounds, whose portraits were painted before the Saxons were heard of; and, above all, he has pointed out that these dogs were of British, not of Roman origin.

These facts are of no slight importance when it is remembered that we are emphatically a hunting nation; and this national characteristic is of no slight importance in an estimate of national temperament. It is not a slow, heavy, phlegmatic people which rides "across country"; the hunting-field gives a flat denial to that imputation which foreigners are apt to fling at us; the imputation results from a confusion between self-control and insensibility—between a virtue and a defect. It is not the man who is readiest with the knife; it is not the woman who is readiest with her tears; it is not the child who is readiest with its cries, that is most sensitive to insult or to pain. There is a disposition which is quick enough to perceive, and ready enough to resent, an insult, but which is also quick to perceive the possibility of a mistake, and is unwilling to exhibit wrath without just cause. Such a disposition is by no means uncommon in England; and if by chance it display itself in slowness of speech or of action, the cause lies frequently not in the deficiency, but in the excess of sensitiveness. I do not wish, by these remarks, to convey the impression that the phlegmatic temperament does not exist in England. It exists more or less in all countries; and it exists to a considerable extent in England, just as round heads exist in considerable numbers in England. But the national character which foreigners attribute to us has probably been in part imposed upon us in consequence of our insular ideas of good breeding, which teach us to repress the feeling that Frenchmen especially delight to display,* and to affect a listlessness in society which is atoned for by every gymnastic vagary that can be committed in any quarter of the globe on either side of the equator.

* Or did formerly. It is now no unusual thing to find a French gentleman affecting all, and more than all, the tranquillity of an Englishman.

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Another cause, which has certainly tended to give us the reputation for slowness among foreigners, is our form of government, which renders it impossible for us to act, as a nation, with the rapidity which can be attained under a despotism. But unless it can be shown that there is a necessary connexion between a phlegmatic national character, and a form of government resembling ours, it is unfair to attribute to the English a phlegmatic disposition from their dilatory action in foreign affairs. Such a connexion it will be found difficult to establish.

One of the best elements in the English character is its energy. It is that energy which is, above all other elements, the cause of the Englishman's various successes; it is that energy which causes his genius to appear so versatile, which forces into action the talents that in a phlegmatic people lie dormant. From that energy results the great diversity of forms in which the Englishman's restless desire for athletic exercise displays itself. And from the same kind of energy resulted that similar diversity of forms which athletic exercise took among the ancient Greeks. Energy—restless, insatiable energy—has been the leading characteristic of the two peoples, and it is a characteristic which we cannot find equally conspicuous—equally uniform—among the Germans, the Dutch, or even the Danes. It is to the blood which we probably possess in common with the ancient Greeks that we may rather attribute the all-important element of our greatness.

It has been remarked* of the English that "when young they cannot sit still an instant, so powerful is the desire for work, labour, excitement, muscular exertion." It is instructive to compare this description, which will be recognised as true in the main, with the description given by M. Esquiros† of the Dutch. He tells us that the Dutch resemble no people in the world but the Dutch; that no stranger can fail to remark their essentially phlegmatic character, which is to be detected even in the inactivity of the children. This fact, it will be

* By Dr. Knox, *The Races of Men*, p. 54.

† *La Néerlande et la Vie Hollandaise*, vol. i, p. 72, *et seq.*

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very difficult to explain if it be admitted that the ancestors of the Dutch were in great part the ancestors of the English. And if the Anglo-Saxons, Frisians, etc., were the ancestors of the English, we must have a common ancestry with the Dutch. Whence, then, comes the enormous difference of temperament?

But, on the other hand, if the Dutch are proverbially phlegmatic, the Welsh, it will be objected, are proverbially fiery—proverbially, that is, in England. But I must here explain that I am not attempting to establish the resemblance of the English to the Welsh character, but rather to the character of that dolichocephalic people, of which remains have been found in Britain and in the Cimbric Chersonese, and which is in all respects opposed to the true Teutonic type. I think it not impossible that some of our Anglo-Saxon invaders, though speaking a German dialect, were themselves almost as nearly akin to that old dolichocephalic people as to the brachycephalic Germans, from whom they are commonly supposed to be an offshoot. Of one of these alternatives, at least, I am tolerably certain—either that the Anglo-Saxons were akin to that long-headed race, or that they were not our ancestors. The probability seems to be that a series of dolichocephalic invaders, coming principally from the Cimbric chersonese and its neighbourhood, peopled the southern part of this island; that they were driven hither partly by their own active disposition, partly by the pressure of the Germans on the east; and that the last comers had suffered so much from this pressure that they were a mixed people speaking the language of the conquerors.

The consideration of the more or less athletic characters of different nations led us naturally to the consideration of energy in general—of the evidences of strong will. It will, perhaps, be best to glance next at the emotional characteristics of different nations, before attempting to draw any conclusions from the complex phenomena of intellect.

It is difficult, as a rule, to pick out any particular emotion for the display of which any particular people is especially remarkable. There is much both in the emotions and in the

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intellect which is common to all human beings. But there is one emotion which is singularly characteristic of most nations commonly classed under the name of Teutonic. That emotion is wonder. So singularly developed is this feeling among the Germans, that a very large number of the adjectives in their language have formed permanent compounds with the word "*wunder*" prefixed. They even have, or once had, an adverb, "*wundershalber*," for the purpose of exciting wonder. And this is no merely conventional way of speaking which has lost its meaning —no piece of slang used from the first without a definite meaning. When a German tells you that some perhaps rather ordinary object is "*wunderschön*," he really means it, as you may see if you watch his features, especially his eyes. His eyelids are elevated, his eyes themselves protrude, and he is more excited than he ever appears to be under the influence of any emotion but wonder. The mention of a large sum of money especially excites this emotion in him; and it appears to give him immense satisfaction to roll out the words "*tausend*" and "*hundert*," and to repeat them again and again, but always with the physical signs of wonder fully displayed.* It is this curious fact which has caused so many authors to speak enthusiastically of the simple character of the Germans; and it is undoubtedly a very pleasant thing to see wonder excited by an object which is wonderful only by reason of the effect it has produced. But it is hardly fair to attribute for that reason a child-like simplicity to the German character; their proneness to wonder is a strong element in their character, but it represents neither the whole of their merits nor the whole of their demerits.

It must now be asked—Is wonder also especially one of the emotional characteristics of the English? On the contrary, it requires a very strong stimulus to excite the wonder of an Englishman; and when anything decidedly new is presented to him he devotes little time to mere wonder, but ponders the question of utility. The Englishman can undoubtedly appreciate

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* For a description of these signs at length, see Bain, *The Emotions and the Will*, p. 68.

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the wonders of the deep, but his energy prompts him to make experiments upon it—to utilise it. He can appreciate all the wonders of nature, but he has not enough respect for her to restrain him from asking questions of her, and from turning the answers to his own advantage. He is fully sensible of the wonders of his own intellect, but he does not evolve a system of philosophy out of his own self-consciousness when in a state of transcendental admiration. In short, one principal distinction between the typical Englishman and the typical German is just the distinction between activity restrained by wonder and activity urged on by energy and daring.

But is there any one emotion which is especially characteristic of the English? If there be such an emotion it is the emotion of Shame, which displays itself in the sense of decency, possessed more or less by all classes of English. It is undoubtedly true that many individuals are wanting in that sense of decency; it is true that there are national customs in England which may perhaps exhibit less of that sense of decency than customs which exist in some continental countries. But it will nevertheless be admitted by most English travellers that when the Channel or the German Ocean is crossed there is found a remarkable lack of what English people call modesty. In England, men and women seem to be generally modest without making any violent efforts to be so; on the continent, men and women seem to make very praiseworthy efforts to be modest without succeeding. There is a curious parallel to be found in Greece, where there existed forms of worship which might be supposed subversive of all modesty; and yet there existed, even in the time of Homer, a kind of modesty* more like that which Englishmen possess, than that which French and German governments enforce.

It has been said by Professor Bain† that there is such a thing as an emotional constitution;‡ that an obese frame generally accompanies this constitution; and that the Celtic races are emotional in comparison with the Teutonic races.§

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* See Homer's *Odyssey*, vi, 221.

† *On the Study of Character*, p. 204.

‡ *Ibid.*, p. 217.

§ *Ibid.*, p. 218.

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The ancient Greeks, he considers, resembled the modern Celts. The discussion of all these propositions would involve us in a labyrinth from which it would be difficult to extricate ourselves in any reasonable time. The generalisation which connects the emotional disposition with the obese frame seems hardly consistent with the wiry, energetic character of the so-called Celts. But the identification of the Greek character with the Celtic character is a singular confirmation, from a wholly independent source, of the arguments which I have here and elsewhere advanced to show the connexion between the ancient Britons and the ancient Greeks. And if modesty be essentially the characteristic of the English people, it shows, perhaps, more than any other feeling could show it, an exceedingly sensitive disposition in that people; it shews a very rapid appreciation of the opinion which will probably be entertained of any given action—a strong sense of self-respect, and a true consideration for the feelings of others.

With this sensitiveness to the emotion of shame is closely connected that quality for which the Englishman is famous at home and abroad—the sense of independence—the sense of personal dignity apart from national dignity. The Englishman, like the Frenchman and the German, has the highest respect for his country; but he has a far greater respect for himself than has either the Frenchman or the German. He has a strong sense of personal individual responsibility, which often restrains both his tongue and his limbs. The Englishman loves his country, but believes that his country owes its existence in part to himself. The Frenchman loves his country, and the German loves his country; but each seems to consider that to his country he owes his existence. The Englishman looks on his country as his child: the Frenchman, like the German, looks on his country as his parent. The Englishman takes pride in reflecting honour on his country: the German, like the Frenchman, sees honour reflected from his country on himself. The French and the German views of responsibility involve, in addition to the ordinary duties of self-preservation certain moral duties towards their respective countries. The English view of responsibility involves still further certain

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moral duties towards self. The Englishman cannot offend the susceptibilities of others without feeling that he has suffered himself. An Englishman wishes to satisfy himself, while Germans and Frenchmen are content to abide by the conventional rules of their own countries.

In any attempt to ascertain the intellectual characteristics of the ancient Britons, it is to the highest order among them, —to the Druids,—that our attention must be directed. The character of that order, their influence, their habits, and their attainments have been most carefully estimated by the author of the article "Druids," in the *Encyclopædia Britannica*;* and as the authorities which he has consulted, and to which he has drawn attention, are all Greek or Latin writers, it is not probable that the portrait is too favourable.

The resemblance of the Druidic habits of thought to those of the ancient Greeks, on the one hand, and to those of the modern English on the other, is most remarkable. The Druids had a system of philosophy which was so like the system of the Pythagoreans, that it has frequently been supposed either that the Pythagoreans borrowed from the Druids, or that the Druids borrowed from the Pythagoreans. Like many of the Greek philosophers, from Thales downwards, the Druids were fascinated by the great problems of the universe, and seem to have almost anticipated some of our modern discoveries. They held that the universe was never to be destroyed or annihilated, but was to undergo a succession of great changes or revolutions. Modern chemists hold that matter is indestructible; and the discovery, which may be considered the correlate of that hypothesis, that forces are interchangeable, is one which England may claim for herself.†

The spheroidal shape of the celestial bodies, and probably

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* The principal original authorities upon which that article is based are Diodorus Siculus, Strabo, Cæsar, Mela, Ammianus Marcellinus, Dio Cassius, etc. In confirmation, it may be mentioned, that in the Welsh Triads there appears a triad of great astronomers; but in the absence of dates, it is, perhaps, too much to assume that these three astronomers lived before the time of the Romans.

† The merit of this discovery lies between Mr. Grove and Mr. Joule.

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also of our own earth, seems to have been recognised by the Druids. This discovery, and possibly also the belief in a cycloidal or circular motion of the planets, seem to have influenced them in building their temples, which appear to have been circular. They certainly were well enough acquainted with the motions of the heavenly bodies to enable them to fix definite periods for their religious solemnities; but as they reckoned by nights and not by days, it is probable that they were best acquainted with the motions of the moon, and did not thoroughly comprehend the existence of the solar year.

The Druids were especially famed for their eloquence. The two nations who have also attained a high reputation for eloquence are the ancient Greeks and the modern English. No ancient nation has left such monuments of rhetorical power as the Greeks; no modern nation possesses such monuments as are to be found in the *Parliamentary Debates*.

But the great feature in the ancient British cast of mind seems to have been its Constructive* Power,—its power of producing poetry, and its skill in mechanics. The British bards have always been famous; and the halo of romance which has been thrown by them round the story of Arthur, has made him famous in all European countries, so that even in France the name of Arthur is as well known as the name of Roland. The statement, that the ancient Britons excelled in mechanics may seem, perhaps, to be no more than mere assumption; but it is certain either that the Britons possessed skill in mechanics, or that they were endowed with some other unknown faculties which enabled them to produce such results as in our time can be produced only by mechanical skill. And as it is never satisfactory to explain the *ignotum per ignotius*, it is only reasonable to assume that certain results were produced by such causes as we know to be capable of producing them. In that case the stones found at Abury and Stonehenge, and in other parts of the island, show that the Britons used wedges and levers; they must have had also

* The term is here used in the sense in which it is used by Professor Bain, for which see *ante*, p. 156.

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the means of transporting great weights to considerable distances; and they were, beyond all doubt, acquainted with the use of wheels, because fighting from chariots was their favourite mode of warfare.

In like manner, constructive power was eminently characteristic of the ancient Greeks, and is eminently characteristic of the modern English. In the rude Cyclopean aggregations of stones, in the architectural adornments of the Acropolis at Athens, and in the final mechanical triumphs of Archimedes, the same love of invention may be detected;—it may be detected in the ruins of Stonehenge,* in the wooden walls which England long ago made famous on the sea, and in the iron roads which she has but just given to the world.

Ancient Greece gave her mechanical inventions and her mechanical terms to Rome, and through Rome probably to a great portion of ancient Europe. Modern Britain has far surpassed the whole world, ancient or modern, in her constructive power. She has discovered how to use steam as a mechanical force.† She has applied steam to ships.‡ She has applied steam to locomotives on railways.§ She has discovered the art of photography.‖ She has invented calculating machines;¶ and her school of naval architecture is indisputably the first in the world.

In addition to all this, Britain and her colonies have invented a number of minor machines and improvements in machinery which it would be tedious to name, but which stamp the British, and especially the English intellect, with a mark that cannot be mistaken.

And among foreigners, neither the Germans nor the Dutch are our most formidable competitors. The Germans may

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* It is stated in the *Encyclopædia Britannica*, art. "Architecture," p. 440, that "it is the opinion of Mr. Higgins, supported, he contends, by the suffrages of Dodwell Clarke, and others . . . that the doorway, called the "Gate of the Lions," in the Acropolis of Mycenæ, is built exactly like the remains of Stonehenge."

† By the Marquis of Worcester, Savery, and Watt.

‡ By Miller and Taylor. § By Trevithick and George Stephenson.

‖ By Wedgewood and Sir Humphry Davy. ¶ By Mr. Babbage.

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boast of Gutenberg as the inventor of printing, of Otto Guericke as the inventor of an air-pump, of König as the inventor of a printing machine; they may tell us that Winsor first lighted London with gas, and they may boast of Steinheil as the inventor of an electric telegraph; but it will be remarked that, with very few exceptions, there is an English claimant as well as a German claimant to the title of inventor, and that even where the discovery is unquestionably made by the German alone, it comes to maturity in England. König's printing machine was first set up in England. There was an American and an English inventor of an electric telegraph contemporaneously with Steinheil, and Steinheil's was established in working order after Wheatstone's and Morse's. So, too, although Winsor hit upon a method of applying gas to street-lighting, he hit upon it in England, and after Murdoch had shown the achievement to be possible.

It is no slight argument in favour of the mechanical genius possessed by the English people, that *all* the great inventions of modern times have first made their appearance, independently if not solely, in Britain; and it is, perhaps, not ungenerous to assume that when a foreigner living amongst us has succeeded in making some new discovery, he has owed a little to the general tendencies of the people among whom he has been living,—to the state of science among his contemporaries. Be that, however, as it may, it does not appear that the Germans,—even when all credit is given them for their inventions in this country,—have approached us so nearly as the French. Some of our greatest mechanical successes are due to a French engineer,—Brunel; and his block-machinery is in itself a great invention. Nicephore Niepce and Daguerre carried the art of photography to a perfection that Wedgewood and Davy failed to approach; and France possesses a number of engineers second only—if second—to those of England. There is a general argument, too, which may show that Germany stands lower than France in her reputation for mechanical skill. When foreign nations require skilful engineers or well-made machinery, they commonly apply to England, but if not to England, to France.

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In answer to this argument it may, perhaps, be urged, that the forms of government which exist in Germany are not so favourable to the development of mechanical genius as the form which exists in England. This is true; but on the other hand, there must be an enormous psychological difference between the people which led the way in denying the right divine of kings, and the people which is nearly the last of European nations to retain a belief in it.

Another form, in which English inventiveness has of late years displayed itself, is novel-writing. From mechanical skill to novel-writing may appear a very long jump; but novels and other works of art require the common element of constructive power, and differ from mechanical inventions only in requiring also the free play of the emotions. And it is in novel-writing that the female intellect of England seems to find the most appropriate outlet for its artistic emotions and its inventive power. English novels travel over the whole civilised world; but they are especially popular in Germany, where the demand is so great that they are frequently translated into German, and no less frequently reprinted in the original. There is no corresponding importation of German or Dutch novels into England, though there is some importation of French novels, which also find their way into Germany. It may be inferred, without rashness, from all these facts that of the different nations under consideration England is the most inventive, Germany the least.

Nor will the conclusion be invalidated by a comparison of the dramatic power shown by the several peoples. England, it is true, is at present, though not inferior to Germany, inferior to France in the production of dramas. But the Drama in England has had a history which will bear comparison with the history of the Drama in any other country. She has excelled equally in tragedy and in comedy; and in both she has had worthy rivals amongst the French. But it can scarcely be said that Germany has had a Drama of her own,—a Drama marked by the true dramatic stamp, by skilfully constructed plots, by characters consistent with the plots and with themselves, and, above all, by well sustained dramatic

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action. Germany once made a great effort in the persons of Lessing, Schiller, and Goethe, to establish a dramatic school; and the effort produced some very fine poetry, but showed at the same time how deficient the German intellect is in the practical adaptation of means to ends. The plays are romantic, pathetic, excellent pieces of writing, but hardly fit for the stage; in short, although they are good poetry, they are bad dramas.

In comedy, Germany falls short even more than in tragedy; she is in fact almost destitute of comedy-writers. And this fact is an index to another broad distinction between the German intellect and the English intellect. Germans are heavier, slower, more given to admiration than the English, and have, perhaps, as a necessary consequence, infinitely less wit and humour. It is probably, as before suggested, partly owing to our insular ideas of good-breeding that we have been called "*tristes Anglais*"; but the epithet is certainly unjust if meant as a description of our national character. England has produced a long line of comedy-writers, wits, and humourists, which not even France or Ireland can surpass, and which leaves Germany far behind; and anyone who chooses to listen to the remarks made among our lower classes, will discover an appreciation of wit and fun, coarse though it may be, which will convince him that we are not "*tristes Anglais*", but inhabitants of "Merrie England."

And while no resemblance in this respect between England and either Germany or Holland can be detected, but, on the contrary, a very great dissimilarity, the resemblance between England and ancient Greece is complete. Both have produced great tragedy-writers, both have produced great comedy-writers. And the resemblance is none the less complete because English drama has not usually conformed to the Greek type; the divergence is only a proof of independent origin, and that independent origin is strong evidence of similarity of intellect.

When we pass from the drama to other forms of art, the comparison becomes more difficult. The origin of what is

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called Gothic Architecture, and especially of pointed Gothic,* is involved in such obscurity that it would be unsafe to attribute it to any nation in particular. Once introduced, the style flourished, especially in Germany, France, and England; but the English soon had a school of their own, which differed in important points from the German school. The Germans, true to their character, delighted in size and height, by which especially might be represented the wonderful, the mysterious. The English, true also to their character, aimed rather at internal decoration, in which the taste for the beautiful might be gratified rather than the taste for the wonderful. The religious feeling of the English seems to have consisted chiefly of love: the religious feeling of the Germans to have consisted chiefly of awe.

And this love of the wonderful—of the mysterious—seems to betray itself with other features of the German character in the German school of music, in which alone the constructive power of the Germans† is conspicuous. Widely different from the passionate melodies of the Italians—from the more playful melodies of the French, German music suggests most frequently awe and admiration. Its harmonies, like the systems of German metaphysicians, though elaborated with the greatest care, delight in the undefined. They bewilder, and they are apparently intended to bewilder.

Mr. Fergusson‡ denies that the Teutons possess artistic power of any kind; tells us that "architecture, painting, and sculpture have been patronised and have flourished in the exact ratio in which Celtic blood is found prevailing in any people in Europe, and have died out as Aryan influence prevails;" that the Teutons are wanting in creative and imaginative power, and that where they appear art flies before them.

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* *Encyclopædia Britannica*, art. "Architecture."

† It must, however, be borne in mind that some of the most famous German composers have been of Jewish blood.

‡ *History of Architecture*, p. 517, *et seq.* Where the word "German" or "Teuton" has been used in the text, Mr. Ferguson uses the word "Aryan"; but according to his nomenclature "Aryan" is nearly synonymous with "German" or "Teutonic", the Celtic nations being by him regarded as non-Aryan.

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Evidence has been adduced in this paper to show that the English are the most inventive of all the nations whose characteristics it is necessary for our present purpose to consider, and the Germans the least inventive; but it has not been suggested that the Germans are altogether devoid of inventive power, and still less will it be argued that they are altogether devoid of artistic power. Mr. Fergusson's verdict, literally interpreted, is hardly just if applied solely to the inhabitants of Germany; it is certainly unjust if intended to apply to the inhabitants of England. But if taken—as it was elsewhere found necessary to take the statement of Tacitus that the Germans had *all* light hair—as a general statement of a broad distinction, the verdict is probably true so far as it relates to the Germans proper. The verdict is only approximately true of the English, so far as it relates to painting and sculpture. England has not certainly distinguished herself above other nations in those branches of art; but it has already been shewn that her constructive power has been drawn off in other directions; and even in those two branches of art it is doubtful whether England has really been inferior to any country except Italy.

The principles of art-criticism are so ill-defined—they are so different at different times—that the subject must necessarily be approached with fear and trembling, and in all humility. But the method of investigation which is pursued in this paper demands that some attempt shall be made to discover national characteristics in national art, and to compare them together. May future anthropologists make a more successful attempt than is made here. A man who has studied the different schools of painting for a lifetime, and who has also a taste for anthropology, would be best fitted for the task. There are, unfortunately, but few who fulfil even the first of these conditions; to them, however, we must apply for information.

Mr. Ruskin's opinion of German painting seems to be thoroughly in accordance with what has been said in this paper of the chief emotional characteristics of the Germans. He says,* "The development of landscape north of the Alps

* *Modern Painters*, vol. i, pp. 88, 89.

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presents us with the same general phases, under modifications dependent partly on less intensity of feeling, partly on diminished availableness of landscape material. That of the religious painters is treated with the same affectionate completion; but exuberance of fancy sometimes diminishes the influence of the imagination, and the absence of the Italian force of passion admits of more patient and somewhat less intellectual elaboration. A morbid habit of mind is evident in many, seeming to lose sight of the balance and relations of things, so as to become intense in trifles, gloomily minute as in Albert Dürer. And this mingled with a feverish operation of the fancy, which appears to result from certain habitual conditions of bodily health rather than of mental culture, and of which the sickness without the power is eminently characteristic of the modern Germans; but with all this there are virtues of the very highest order in those schools, and I regret that my knowledge is insufficient to admit of my giving any detailed account of them."

This description seems to indicate a desire on the part of German painters to excite wonder, no matter how; to impress spectators with a vague sense of the mysterious. And this desire is coupled with an intellectual peculiarity which, as will subsequently be seen, is also characteristic of German science —an extraordinary love for the accumulation of minute details, but, as a rule, without a corresponding development of constructive power.

And this same love of detail for itself appears also in the Dutch school of painting. To quote again from Mr. Ruskin*— "Among the professed landscapists of the Dutch school, we find much dexterous imitation of certain kinds of nature, remarkable usually for its persevering rejection of whatever is great, valuable, or affecting in the object studied." And again: "The very mastery these men have of their business proceeds from their never really seeing the whole of anything, but only that part of it which they know how to do," and more to the same effect.

* *Modern Painters*, vol. i, p. 90.

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Mr. Wornum's* account of the Dutch school is not, in the main, at variance with that of Mr. Ruskin. "The works of their Dutch contemporaries, on the other hand, were remarkable for scrupulous fidelity of imitation and the closest familiarity of subject. The characteristic Dutch school dates its origin from this period (the seventeenth century), and it may perhaps not unjustly be termed the illusive or the microscopic school, minute exactness of imitation being its principal element. Every branch of art—history, genre, landscape, portrait—all are alike conspicuous for the most scrupulous imitation, even to the utmost elaboration of the textures of substances."

But it must not be forgotten that the Dutch produced Rembrandt; and that Rubens, though a native of Cologne, was of the Dutch school. Rembrandt, whom Mr. Wornum characterises as the "most attractive and original of painters," seems to have excelled all the Dutch school in constructive power; he soared above simple imitation and attained originality. Rubens, too, possessed great constructive power, even though the composition of his "Descent from the Cross" may have been borrowed from an Italian print. But the national characteristics appear not so much in the exceptions as in the general body of artists. There are exceptional individuals in all nations; and there can be no greater error in anthropology than to suppose that, because a nation has a particular type, corporeal or mental, all the individuals of the nation must necessarily conform to it. Germany produced Rubens, and Holland produced Rembrandt; but neither of these painters can be accepted as representing the type of their respective nations, because there is evidence to prove that the types of those nations are extremely different.

When we pass over to England we find it more difficult to assign any distinctive peculiarity to her painters. It has already been remarked that the constructive power of the English has been diverted into other channels; it is, therefore, probable that the great and characteristic school of English painting has yet to arise. But, if English painters have a

* *The Epochs of Painting*, p. 434.

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characteristic, it is probably that constructive power of which so much has already been said. Of one of Gainsborough's pictures Mr. Ruskin has remarked, "nothing can be more bold or inventive." Mr. Ruskin also speaks of the faculty of "imaginative association," which seems to be nearly identical with the "constructive association" of Professor Bain. This faculty, he considers, was possessed in the highest degree by Turner.

But it is not safe to generalise from one or two instances; it is not safe to assert more of the English school of painting than that its constructive power is at least as well marked as any other characteristic. If this be admitted, the art-characteristics of the different nations compared, though they will have added but little to confirm my previous conclusions, will certainly not be found to throw any doubt upon them.

And before dismissing this part of the subject, it may be worth while to draw attention to the fact that, whatever their artistic skill may be, the English are certainly great lovers of beauty. This is manifest from the beauty of the people, and especially of the women. It is a well-ascertained fact that personal peculiarities are hereditary; and if the English people were in the habit of selecting ill-favoured wives and husbands, it is impossible that the English could be generally well-favoured. That they are so is admitted, even by foreigners; and it is irrational to attribute the fact to mere chance, when the principle of conjugal selection* thoroughly explains it.

The beauty of the Greek features and form is also proverbial.

Among modern European nations there are probably none who have excelled the English in poetry; perhaps none but the Italians have equalled them. From Chaucer, through Shakspeare, Spenser, Milton, Pope, Shelley, Byron, and a host of others, even to the present day, there has been a succession of poets, of which any nation may reasonably be proud. There is, perhaps, no kind of poetry of which the English have not produced good specimens; and there is hardly any branch of

* As set forth by Mr. Darwin, in his work *On the Origin of Species.*

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the art in which they have not displayed originality. Here the resemblance is well marked between the English, the ancient Britons, and the ancient Greeks; and hardly less well marked is the contrast between the English and the Germans. The German poets, though numerous, resemble one another in their almost universal love of the wonderful, the mystic, the supernatural. It is through wonder that the Germans are most easily moved, while other European nations have wider emotional sympathies. Thus it happens that with the exception of Goethe and Schiller, Germany has produced scarcely a poet of European reputation; and even Goethe and Schiller, great as they undoubtedly were, owed not a little to their study of Shakspeare. And it may be remarked that while the Germans—always enamoured of the wonderful, always anxious to elaborate—are frequently turgid and obscure, and have displayed but little variety in their compositions, the English may set up Shakspeare as a model for versatility, Pope as a model for clearness and rhythm, and Byron as a model for descriptive power and beauty of simile.

As in dramatic poetry, so in all other kinds of poetry, constructive power is a necessary element, but most of all in dramatic poetry. But one of the most essential qualities for composing all kinds of poetry is the faculty of perceiving resemblances. That faculty is equally necessary in the experimental sciences, in the arts, wherever genius can show itself. It has not hitherto been considered in the comparisons already drawn; because it was thought that the consideration of one element at a time would have the effect of making the subject clearer, and because, in those intellectual phenomena which have hitherto been discussed, constructive power was thought to be the distinctive element. In all kinds of poetry, except the dramatic, the faculty of perceiving resemblances may perhaps be considered the most important, though neither retentiveness nor constructive power can be dispensed with.

The comparison drawn between the poetry of Germany and of England seems to leave a balance of "similarity,"* no less

* The word is used here in the sense in which Professor Bain has used it, —the faculty of perceiving resemblances.

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than of constructiveness, in favour of England, while, on the other hand, the great elaboration which characterises almost all forms of German art, seems to incline the balance, so far as contiguity* is concerned, in favour of Germany. And a comparison of German philosophy and science with the philosophy and science of England will lead to a similar conclusion.

It has been said by Mr. Fergusson,† that to the Aryans (by which term he means the Germans as opposed to the Celts) induction owes its birth. Induction, in a certain sense, it is true, owes its birth to the English, but it seems, even when discovered, to be absolutely repugnant to the German mind. German intellect displays itself in two forms; sometimes it assumes certain premises, and reasons out from them a system of philosophy which is complete in every detail; sometimes it collects together an immense mass of facts, some important, others unimportant, which are either not reasoned upon at all, or are reasoned upon without having previously been digested. In the former case endless systems of metaphysics come forth, each at variance with its predecessor; in the latter case appear lexicons, grammars, editions of the classics, monographs upon various subjects. In the former case the details of all those questions which the system is to explain, seem to be carefully impressed upon the mind before the premises are assumed; in the latter case fact after fact is heaped upon the mind with a perseverance which would be painful to any human being not gifted with extraordinary powers of retaining impressions, which would be considered labour lost by any one possessed of strong similarity—of great powers of classification. But in both cases the love of the wonderful, of the mystic, is strongly marked. In the one case it is gratified by reasoning from the unknown to the unknown; in the other case it is gratified by mere mass or quantity—by the "*wunder-grosz.*"

But both the emotion of wonder, and the love of detail for itself, are antagonistic to the spirit of induction—a spirit which has been characteristic of English genius even when it has been tempted into the quicksands of philosophy. Through

* Which embraces observation and memory.

† *History of Architecture*, p. 525.

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that spirit, Hobbes was led to the psychological discovery of the laws of association, a discovery in which he had been partly, at least, anticipated by Aristotle. Through that spirit the investigations of Locke and Berkeley have suggested to later thinkers that the study of metaphysics, though not necessarily of psychology, must always be futile.

The results of the English school have been arrived at through experience. Far different has been the progress of German speculation. Always subjective, and therefore always dogmatic, the school of German metaphysics has, since the time of Kant, passed through a period of dogmatic Pantheism, and has at last culminated in equally dogmatic Atheism.* This fact is a curious refutation of the assertion made by Mr. Fergusson, that it is especially the German who recognises one God, and especially the Celt who recognises many.

But as all the reasoning processes have been referred to the "law of similarity," it may with reason be suggested that the Germans, having shown a great love of abstract speculation, must necessarily possess great power of perceiving resemblances —must be strong in the faculty of similarity. To adopt the language of Mr. Mill, whose theory of the reasoning processes will be found to be strictly in accordance with that of Professor Bain—deductive reasoning depends upon the discovery of *marks* of certain qualities, or of marks of those marks; and to discover those marks there must undoubtedly be a strong faculty of similarity. But to make sure of what is commonly called the universal proposition before drawing deductions from it, a far stronger faculty of similarity is required. It is the general law which is the true foundation of all sound reasoning, *i.e.*, it is the discovery of the general law which, above all things, requires an intellect powerful in discovering resemblances amidst differences. A certain power of deducing results from a general law may be acquired; but for the discovery of the law itself a great natural endowment is absolutely necessary.

Nor can this fact be disproved by the equally certain fact,

* For this, see especially the work of Dr. Louis Büchner, *Kraft und Stoff*.

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that all sound reasoning is in reality from particulars to particulars;—that the universal proposition is but a convenient registration of observed phenomena.* By the careful application of certain rules any man, with a love of detail, may reason correctly from certain data, and his conclusions will be as correct as the data themselves; but it is only the man with a genius for perceiving resemblances who can establish those data on a scientific footing. The true man of science—the man who reasons from observed facts—discovers that a certain phenomenon has, in a great number of instances, accompanied a certain other phenomenon or certain other phenomena; he probably makes certain experiments with a view of eliminating all possible conditions but those which he supposes to be invariably accompanied by the phenomenon in question; and he then pronounces that wherever certain phenomena are found, a certain other phenomenon will be found also, and from that discovery further useful results may be deduced according to fixed rules. But though a certain amount of ingenuity is, without doubt, necessary for the discovery of such new results, there is an enormous difference between the discovery of those new results and the first discovery of the law; and that difference is just the difference between scientific reasoning and mere subjective reasoning,—perhaps it is not too much to say between the typical English intellect and the typical German intellect.

Germany has, without doubt, produced some great discoverers and generalisers from experience: such men were Copernicus,† Kepler, Leibnitz, Goethe, and Oken. There is, perhaps, no European nation which has not produced great discoverers. Italy has produced among others, Ubaldi, Galileo, Torricelli, the Bernouillis, Galvani; France has produced Descartes, La Grange, La Place; England has produced Newton, Halley, and other astronomers, in addition to all those great inventors who have already been mentioned. But the steady scientific method of the English is characteristic of the people,

* See Mill's *System of Logic*—on the "Syllogism."

† Who was, however, possibly of Polish descent.

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and is essentially opposed to the method of the Germans. The English—*par excellence* the "*audax Iapeti genus*"—have divested themselves of that greatest of impediments—wonder. As Professor Bain has remarked,* "in matters of truth and falsehood, wonder is one of the corrupting emotions. The narrations of matters of fact are constantly perverted by it; while in science Bacon might have enrolled it among his 'idola.'" The English know the true value of facts; they know how to arrange them, to classify them, to utilise them. They know also the value of theories; they know how to verify them, to apply them, to utilise them. The Germans, on the other hand, seem to value facts for their quantity rather than their quality;—to value theories for their mysticism, for the satisfaction they afford to the theoriser rather than for their agreement with established facts. And hence, even Oken—perhaps the most remarkable discoverer of resemblances that any country has produced—was so little careful to make sure of his facts, that of all his suggestions, the suggestion of the homologies of the skeleton is the only one for which his name is famous.† His power of similarity was enormous; but he lacked that constructive power which is necessary for verification.

When, therefore, it is remembered that both constructive power and the power of perceiving resemblances are necessary for all great discoveries, for all great inventions, for all great poems, it will be seen that in those two regions of the human mind the Germans are somewhat circumscribed as compared with the English. It appears that where an exceptional individual among the Germans has one of these faculties highly developed, he is deficient in the other. Germans can produce an Oken, strong in similarity; or a Handel, strong in constructive power; but not a Watt or a Shakespeare, equally strong in both.

When, on the other hand, it is remembered that very strong retentiveness is required for compilations of all kinds, in

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* *The Emotions and the Will*, pp. 69, 70.

† See Bain *The Senses and the Intellect*, p. 511.

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which the Germans especially excel, it will be seen that in that region of the mind the Germans apparently surpass the English.

And from these two considerations it will be seen that there is a twofold distinction between the intellect of the Germans and the intellect of the English,—a difference such as might be expected, when the different types of skulls prevailing among the two nations are borne in mind.

And there exists between the Teutonic nations and the English a moral difference precisely analogous to these intellectual distinctions. The people of all European nations are fond of amassing money, the Germans, perhaps, not less than the English. But the Teutonic nations seem to have a greater love of money, for its own sake, than the English. Precisely as the Germans amass facts, without caring for the results which may be deduced from them, they amass money without any corresponding desire to spend it. The great German merchant is a merchant; the great English merchant is a merchant-prince. The remark which M. Esquiros has acutely made* respecting the Dutch is no less true of the Germans, "le propre du caractère hollandais, même quand il s'élève vers la grandeur, est de rester simple." The *simplicity* of the German character is proverbial.

It has been said,† too, that the Germans resemble the Greeks in sending forth numerous colonies. No statement can be farther from the truth. The Germans *emigrate,* but do not colonise,—precisely as they carry a new discovery to further results more frequently than they make the discovery itself. England is the great coloniser, just as in former times Greece was the great coloniser; but wherever England sends colonies, Germany sends emigrants. There is an immense difference between these two things,—a difference as great as the difference between *wonder* and *daring*.

An attempt has been made in the foregoing sketches—and they cannot pretend to be anything more—to show that there

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* In *La Néerlande et la Vie hollandaise,* vol. i, p. 83.

† Donaldson, *New Cratylus,* p. 132.

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is a well-marked distinction between the psychical characteristics of the Teutonic peoples and those of the English, just as there is a well-marked distinction between their respective physical characteristics. And, at the same time, an attempt has been made to show that where the English differ from the Germans they agree with the ancient Greeks, while the Greeks form, as it were, the connecting link between the ancient Britons and the modern English. Some of the evidence which establishes that link has been given here, but still more elsewhere. There is, however, a little more evidence on that point which may be adduced here.

Every Greek scholar knows better than he can express the meaning of the Greek τὸ καλόν; and yet there is a very near approach to that meaning in a Welsh triad, which may possibly have been handed down from a remote period: "the three ultimate intentions of bardism: to reform the morals and customs; to secure peace; to celebrate (or encourage) all that is good and excellent."* And, on the other hand, the institutions and the character on which the Englishman prides himself show the existence of a very similar spirit. English courts of justice are acknowledged to be the fairest and most merciful in the world; the "English love of fair play" is hardly ever out of an Englishman's mouth; and an Englishman's sense of honour is the necessary counterpart of his "pluck."

It is difficult to compare the scientific methods of any ancient nation, or the results attained by them with those of any modern nation. As Mr. G. H. Lewes has happily remarked,† "Science is a growth. The future must issue from seeds sown in the past. The bare and herbless granite must first be covered with mosses and lichens, and from their decay is to be formed the *nidus* of a higher life." But Aristotle is more nearly resembled by Bacon or by Hobbes than by any thinkers of other countries. Aristotle saw dimly, as Bacon saw clearly, that theories were worthless unless based on facts; he discovered from the *facts* of his own consciousness what Hobbes,

* The translation of Davies (*Celtic Researches*) is here adopted.
† Aristotle, p. 47.

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perhaps, more definitely discovered again, that there existed some sort of order even in the caprices of memory or fancy.

Statesmen, both in England and in ancient Greece, have generally conformed to a common type, though in both countries there have been exceptions. They have won the confidence and the love of their countrymen not less by their moral character than by their intellectual attainments. Not separated by an impassable gulf from the great body of those who have entrusted them with power, they have been the representatives of their country, not an independent class existing apart. In his greatest statesmen, the modern Englishman and the ancient Greek of average disposition and attainments have been able to recognise themselves as in a flattering portrait. In those statesmen the great characteristics of Greeks and Englishmen have been most conspicuous, because most magnified. Such statesmen—and a number might be cited from the annals of either country—have been energetic, generous, honourable, hospitable, full of all human sympathies; they have not sacrificed the man to the politician. With life and vigour to spare, after giving the cares of state their due, they have excelled in the literature, the art, and even the science of their day. They have learned to shine in the *salon* no less than in the national assembly. But, above all, they have fostered, and even taken part in all the pastimes and athletic sports of their country; and where such pursuits have led them into reckless extravagance, their vagaries have been readily forgiven as mere exaggerations of national good qualities.

Northern Germany has not produced such statesmen in great numbers.*

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* The discussion on this paper has in no way shaken my opinions. They are founded, so far as the Germans are concerned, not only on my own limited acquaintance with German customs and German literature, but on the observations of German, French, and English critics. The principal books which I have consulted, in writing this portion of my work, are *The Emotions and the Will*; *The Senses and the Intellect*, and the *Essay on Character*, by Professor Bain; *The History of Inventions*, by Beckmann; *The New Cratylus* and the *Essay on English Ethnography*, by Donaldson; the Preliminary Dissertations, and the articles on the different Inventions, the

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Drama, Poetry, etc., in *The Encyclopædia Britannica*; *L'Angleterre et la Vie Anglaise*, and *La Néerlande et la Vie Hollandaise*, by Esquiros; *The History of the Styles of Architecture*, by Fergusson; *The Roman and the Teuton*, by Kingsley; *The Races of Man*, by Knox; *Die Marschen und Inseln der Herzogthümer Schleswig und Holstein*, by Kohl; *The Life of Goethe*, *The Biographical History of Philosophy*, and *Aristotle*, by G. H. Lewes; *German Life and Manners*, by Mayhew; *Die Deutsche Literatur*, by Menzel; the articles on Poetry, on the different Inventions, etc., in the *Penny Cyclopædia*; *Modern Painters*, by Ruskin; *The Lives of Bolton and Watt*, by Smiles; *De l'Allemagne*, by Madame de Staël; *The Germania and Agricola of Tacitus*; *Historic Survey of German Poetry*, by Taylor; *Social Life in Munich*, by Wilberforce; and *The Epochs of Painting*, by Wornum.

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XII.—*On the Iconography of the Skull.* By W. H. Wesley, Esq., F.A.S.L.

In treating of this subject, I shall first endeavour to point out the best method of drawing the cranium, and then briefly direct attention to some of the faults which such drawings most frequently exhibit.

There are two methods of delineating natural objects upon a plane surface; the one we may call *the geometrical*,—which is the method recommended by Dr. Lucae; and the other is the ordinary *perspective* method of delineation.

Drawings upon the geometrical system, are simply elevations or plans not taken from one point of sight; the line of sight being always perpendicular to the plane of the projection. Dr. Lucae's instrument for drawing upon this principle, consists of a plate of glass placed over the object to be delineated, and over this plate an apparatus by which the eye is always perpendicularly above the plate, while the drawing is being traced upon it. In these drawings, therefore, there is no perspective, and no foreshortening; everything is represented as it really is, and not as it appears to the eye.

The great advantage claimed for the geometrical method, is that drawings made upon that system are not only comparable with one another, but *measurable*. This is, however, only true to a certain extent; for geometrical drawings are only measurable upon lines parallel to the plane of the projection, and perpendicular to the line of vision. It must be remembered, also, that perspective drawings are measurable upon the most important plane of all, viz., *the centre line of the skull*. All planes nearer to the eye than this line, are in perspective drawings increased, and all planes more remote from the eye, are reduced in size.

Still it may be urged, that geometrical drawings are much more capable of measurement than drawings made on the

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ordinary perspective method, and this is undoubtedly the truth. If we have a sufficient number of geometrical elevations from different points of view, we can obtain from them all the principal measurements without referring to the original skull, and perhaps even more readily.

This appears to be a great advantage which the geometrical method possesses, but I believe it to be more apparent than real. We have only to ask ourselves, What is the end aimed at in drawing the skull, and what is the use of such delineations? Without doubt, their use is to supplement the tables of measurements, which will always be required whatever method of drawing may be adopted. The one question, then, about the two methods of drawing is, which best subserves this end? I believe, without question, the perspective drawing. It is true, that the geometrical drawings give accurate measurements, but these are also supplied by the measurement tables. Geometrical drawings do not give the general impression of the skull which tables of measurement cannot give, and to supply which is the only end for which drawings of the skull are required. These delineations are required as substitutes for the examination of the skull itself, and not to supply the place of measurement tables.

Perhaps a more serious objection against geometrical drawings, is that they are not comparable with the objects delineated, and are, therefore, unintelligible and confusing. This will be evident, if we consider that in geometrical representations the object is not drawn as it appears to the eye, but as it actually is. The impression produced upon the eye by an object is that of a perspective drawing, and not of a geometrical elevation; since in observing any object, those parts nearer to the eye appear larger than they are in reality, and those parts further removed appear less: thus, we have foreshortening, and those effects which we call perspective.

The fault most frequently committed in drawing the skull, is a want of attention to its position. We sometimes see skulls represented in what is called three-quarter face; this is the view most frequently given by artists in ordinary portraits, but it is most ill-adapted for scientific purposes. Since in

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such drawings the centre line of the skull is not perpendicular to the line of vision, no measurement is possible. Examples of this may be seen in Morton's *Crania Americana*. Drawings of the skull are valueless, except in strictly geometrical positions.

We frequently see drawings of the cranium which are almost useless, in consequence of inattention to their position in regard to elevation. If the skull is inclined forward, the forehead will appear larger in the front view than it should be, and the chin and lower part less, and *vice versâ*. In the side view, a skull inclined forwards will appear less prognathous, and one inclined backwards will be more so. It is absolutely necessary, if drawings of the skull are to be comparable with one another, that some fixed vertical or base line be adopted, which shall regulate their position. The true or natural base line is not easily obtained. There is in the living person one position in which the head is at rest, perfectly balanced upon its supporting vertebræ; but it is impossible to determine this in the dried skull. The base of the cerebral cavity is the only true base line of the skull; but to obtain this it is necessary to bisect the skull longitudinally. It is much to be desired that this were generally practised; but till that is the case, we must adopt some fixed line, which may be seen without dividing the skull. The most frequently adopted position is that which is regulated by the vertical line of Mr. Busk, drawn from the top of the skull, at the coronal suture, to the centre of the auditory foramen. A skull so placed that this line shall be vertical, will be found to be pretty nearly in the natural upright position. This vertical line is so convenient and so easily obtained, that it is now very generally adopted.

Instead of this vertical line, a fixed horizontal line has been recommended, drawn from the inferior nasal spine to the centre of the auditory foramen. If this line be chosen, the skull will be very nearly in the same position as that in which it is placed by Mr. Busk's vertical line. This horizontal line certainly possesses the advantage of being as easily determinable upon the living head as upon the dry skull. Still, I do not imagine that it is of very great importance which of these lines

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be chosen, so that we only obtain uniformity in cranial delineations. All fixed lines are more or less arbitrary, except those founded on the true base of the cranial cavity—viz., a line drawn from the anterior margin of the foramen magnum, through the sphenoid, to the perpendicular plate of the ethmoid.

Leaving the interior of the skull out of consideration, five views are required to represent it thoroughly; the side or profile, the top or vertical view, the front, the back, and the base view. The ordinary way of drawing the vertical view is to make the line of sight coincident with the assumed vertical line, or perpendicular to the horizontal line. Sometimes, however, the vertical view is so drawn as to show the extreme length of the cerebrum—the plane of the projection being a line drawn from the frontal to the occipital protuberances. I prefer the ordinary method, as in prognathous skulls it exhibits the degree of prognathism, as well as that of dolichocephaly. In drawings from the other point of view, the jaws cannot be seen in the *norma verticalis*.

That our delineations may be comparable with one another, the distance between the eye and the object should always be the same. A drawing of a skull or other object taken from a distance of six feet is not perfectly comparable with one taken from a distance of three, since the amount of foreshortening is much greater in the latter.

For scientific purposes, elaborately shaded drawings are not required; indeed, pure outlines are far preferable to drawings in which any details are obscured by the shading.

For the purposes now under consideration, drawings should always be made to some fixed scale. Half and quarter sizes are most to be recommended for drawings of skulls. They have the great advantages that their measurements are easily comparable with one another, and with those of the original skull. Third size is inconvenient because it is not easily comparable, especially with drawings on the scale of one-fourth. In many cases, quarter size drawings are sufficiently large, while if more detail is required, half size will generally show it, and is in many respects more convenient than the full size of nature.

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It is not necessary for me to say anything on the use of the camera lucida; but I should mention that this instrument is indispensable, both for the great saving of labour and for the accuracy of outline obtained by its employment.

A few words may not be out of place here upon the application of photography to craniology. Many skull photographs are rendered almost useless in consequence of the operator being seldom an artist, and still more rarely a scientific man. The mistakes about position, elevation, etc., which, as before observed, are common to many *drawings*, are even of more frequent occurrence in *photographs* of the skull. Too great attention cannot be paid to the lighting of photographs, since in a photograph, as in nature, there is no outline. Everything is defined by the shading, so that if the lighting be injudiciously managed, the object cannot be correctly represented. By the arrangement of the light alone important parts may be suppressed, and insignificant details be brought into undue prominence. If the light be all to the front of the object photographed, it will possess too little relief, and all minute details will be rendered invisible. If the light is from the top exclusively, all lines approaching the horizontal will be exaggerated, while all vertical lines will be more or less suppressed. If the object be lighted only from the side, a line down the centre will divide the perfectly light from the almost perfectly dark in which everything but the general outline is lost. The light should be neither from the front, top, nor side, but a combination of all three, or three-quarter light.

It does not appear to me probable that photography will ever supersede drawing, for scientific purposes. For portraits of living persons, of course photography is admirably adapted, but for skulls it has objections which are scarcely to be overcome. If the lighting of the picture be perfect, it is still a disadvantage that the photograph renders every minute detail with absolutely certain fidelity. Stains and imperfections of the bones, cracks and holes, cannot be omitted in the photograph, and often much obscure its clearness, while if the operator is not skilful, these accidental details will often be

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the most distinctly represented. A really accurate camera lucida drawing is far more valuable than most photographs, however they may excel it in artistic effect. Science owes much to photography, and photography is no doubt capable of much improvement; but I still think that the work of the artist will never be altogether dispensed with, nor be superseded by any merely mechanical process.

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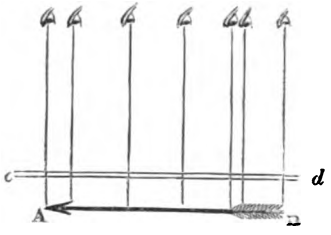

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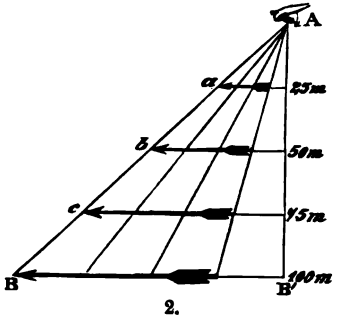

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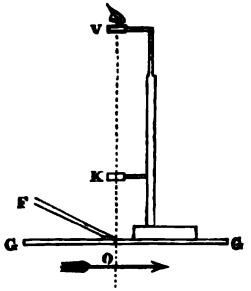

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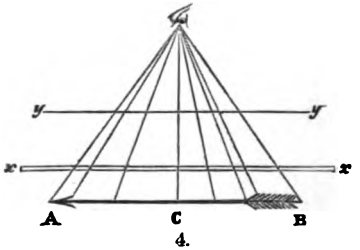

4.

LUCAE'S ORTHOGRAPHIC INSTRUMENT.

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XIII. — *On the Orthographic Projection of the Skull.* By Alfred Higgins, Esq., Hon. For. Sec., F.A.S.L., Foreign Associate of the Anthropological Society of Paris.

Anthropologists are now all but universally agreed, that a careful and minute study of the variations of bodily structure, more especially as regards the bony system, affords the only secure basis for a natural history of man. The diligent collection of human remains, both ancient and modern, becomes, therefore, of the highest importance to the future progress of anthropology. A few isolated specimens, unless they can be in some way rendered available for comparison with larger collections elsewhere, are of but slight value. The individual variations in so highly organised an animal as man, are of course inconceivably great; and necessitate the examination of large series of specimens, if we would arrive at any just conclusion as to what osteological peculiarities are really characteristic of natural anthropological groups. Unfortunately, however, the collection of well authenticated skulls, to say nothing of entire skeletons, is a matter of extreme difficulty; and although, during the present century, a comparatively large number of these objects has been brought to Europe from all parts of the globe, they are so scattered as to be but little available for scientific purposes. It was on this account that Professors von Baer and Rudolph Wagner proposed, two or three years since, to hold an international exhibition of skulls at Göttingen, and thus to bring together large series of some of the more remarkable groups of cranial forms. Unfortunately, the projected exhibition was unavoidably delayed; and, finally, the lamented death of the venerable Wagner put a stop to it altogether. I venture, however, strongly to commend this idea to English anthropologists; and to hope that very shortly we may see, either at the College of Surgeons or in connexion with the meeting of the British Association, an international exhibition of crania, on a scale worthy of English science. It

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cannot be doubted that, with the resources at our command, and aided, as I am sure we should willingly be, by foreign *savants*, an exhibition might be got together, which would exercise a most important influence on the future of anthropology. Such an exhibition would, however, necessarily be of very limited duration, and could be but very seldom repeated. It is to other means we must look if we would render available for extended comparison and minute investigation the treasures concealed in the countless public and private collections of Europe and America.

One of the most important of such means will, it is believed, be found in the publication of plans and elevations of skulls, constructed on the same principle as the mechanical drawings of engineers, and with the same scrupulous exactness. Professor Lucae of Frankfort has devised an accurate, cheap, and readily executed method of making such geometrical projections; and it is with the object of describing his apparatus and inviting a discussion, as to the value of geometrical *versus* perspective drawings for craniological purposes, that the present paper, which makes no pretence to originality, has been written. Although the *Morphologie der Rassenschaedel*, the work in which Professor Lucae described his improved method of orthographic projection, was published in 1861, and notwithstanding that this method was adopted by an anthropological congress held at Göttingen in 1861, at which several of the first anthropologists in Europe assisted, it has never been described before an English scientific audience; and, as far as I am aware, a passing allusion in the *Natural History Review* for October 1862 is the only reference that has been made to it in England.* The fact of the geometrical system of drawing skulls having been approved of by such men as Von Baer, Rudolph Wagner, and Vrolik, will, I hope, be sufficient excuse for my venturing to ask you to examine candidly a method which promises such signal advantages. There is no novelty in drawings of this kind as applied to natural history. Albinus's

* Since this paper was written, Professor Lucae's method has been described in our President's edition of Vogt's *Lectures on Man*.

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anatomical plates profess to be geometrical; and D'Alton appears to have anticipated in its essential point the method adopted by Professor Lucae.

Before I describe Lucae's apparatus, it will be necessary to refer briefly to the respective principles on which perspective and geometrical drawings are constructed. In the former, the object represented is supposed to be viewed from a fixed point; but in the latter, the observer is supposed to stand *directly opposite* each point represented. Figure 1 is intended to show the way in which objects are viewed in geometrical delineation. The arrow indicates the object, and the vertical lines the mode of vision. The eye, it will be seen, constantly changes its point of view, and thus each particular spot is looked at vertically. Suppose *cd* to be a plate of glass parallel to the arrow, and that we draw thereon the arrow, as viewed in the manner described, it is evident that the drawing will be of the exact size of the arrow. If the eye be moved further from or nearer to the glass, or the glass to the object, the drawing taken will not vary in any particular. Geometrical drawings, then, represent objects as they exist extended in space, as far as this is possible on a plane surface, and they are not intended (except secondarily) to represent things as they *look*.

Figure 2 elucidates the principles of perspective drawing. The lines radiating from the point of sight indicate the mode of vision. If a glass plate be introduced, as in the former case, and the object, viewed in the manner now indicated, delineated thereon, only the central portion of the drawing will correspond to the object; all the rest will be foreshortened. A will appear at *a* and B at *b*. If in this case we vary the distance between the eye and the glass, or the glass and the object, the proportion of the several parts of the drawings made on the glass plate will vary too. It is evident from this, that perspective drawings are not strictly and minutely comparable the one with the other; as, even supposing that the drawings are all taken at the same distance from the objects, the amount of foreshortening will vary in each case with the form of the objects. Geometrical drawings, however, admit of strict com-

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parison *inter se*, as all planes in the object which are parallel to the plane of the drawing are shown without any foreshortening.

It will be at once objected, that we do not view objects from a plane, and that, therefore, geometrical drawings cannot afford any idea of objects as they appear to us, and as they alone exist with regard to ourselves. To this objection Lucae replies, that we do see things geometically when we view them from some little distance, as the rays from such objects are practically parallel; and besides this we retain in our minds a geometrical rather than a perspective image of objects. When we examine a skull, we do not view it from a single point; we constantly change our point of view; and, moreover, our judgment is generally materially aided by the sense of touch. Besides this, our eyes present us with stereoscopic not perspective views.

I will now proceed to describe Professor Lucae's apparatus. It consists essentially of a plate of glass, suspended horizontally, under which the object to be drawn is placed, and of an instrument affording a vertical axis of vision, moveable horizontally upon the glass plate. This glass plate, which should be four decimeters square, is let into a heavy oak frame, so that its upper surface is continuous with that of the frame. At the four corners of the frame there are four pegs, by means of which it is fixed in *a horizontal position* on a small table or stool, the top of which has a piece cut out of it of the size of the glass plate. The height of the stool with its frame should be about three and three-quarters decimeters. I am indebted to Professor Lucae himself for these details, and it is through his kindness that I am able to exhibit to you the instrument for giving the moveable vertical axis of sight. A plan of this instrument is given in figure 3. v is a diopter, and k the intersection of two crossed threads; the vertical axis is vk. When we look through the diopter in the direction of the crossed threads we see the object lying under the glass, g, g. The instrument is brought successively over each part of the object, and every point we wish to reproduce in the drawing is noted on the glass, by marking with

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ink the exact spot covered by the point of intersection of the crossed threads. We have only to connect the points thus laid down, and we have a perfect geometrical drawing. By breathing on the glass plate, laying on it a piece of paper and rubbing the latter with a paper knife, the drawing may be copied and transferred directly to the lithographic stone.

Lucae's apparatus can also be used for reducing the geometrical drawings, by simply laying them under the glass, and tracing the outline as viewed through the diopter alone, the instrument being kept in one position. The amount of the reduction will depend upon the distance of the drawing from the glass, or of the latter from the diopter. If the eye and the drawing are equidistant from the glass plate the reduction will be one-half. If the glass is three times further from the drawing than it is from the eye, we get a drawing a quarter of the size of the original. In a similar way the apparatus may be used for reducing the drawings to a common dimension, *e.g.*, making the length of two skulls correspond, in order more readily to compare the other dimensions.

It may be thought that practically there is considerable difficulty in taking drawings in the way I have endeavoured to describe, and indeed Professor Vogt, in his *Lectures on Man*, complains that such is the case. He thinks that to anyone accustomed to the ordinary method there is very great difficulty in geometrical drawing. He allows that in a comparatively short time an accurate outline may be drawn, but he complains that the lines are coarse, owing to the unequal extent to which the glass absorbs the ink, and that the light cannot be so managed that all parts of the object may be seen with the requisite distinctness. As regards the former difficulty, it can easily be avoided by transferring the dotted drawing from the glass to the paper before completing the outline; and the latter difficulty is got over by drawing at a table near a window, and using a small mirror for the illumination of dark parts. The glass plates should be very smooth and dry, and fine steel pens and copying ink should be used for drawing. Great attention must be paid to the accuracy of the diopter, and it must frequently be tested by carefully

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drawing an outline four times, the instrument being turned round ninety degrees each time. The adjustment is to be made by shifting the eyepiece.

To return to the great objection which will be made to these drawings, namely that they are not correct representations of objects according to the ordinary mode of looking at them. What I am about to relate will, I think, prove conclusively that they, at all events, sufficiently resemble perspective drawings to answer every purpose that they do. Professor Lucae caused a careful geometrical drawing to be made of a well-known bust of Soemmering, and showed it to several artists of eminence. They none of them detected that it was not a perspective drawing, although the bust was quite familiar to them, and even the sculptor himself confessed that he should not have known that the drawing was not perspective if he had not noticed that the base line of the front of the bust was continuous with that of the side, instead of forming an angle with it. This bust is figured by Lucae in the work already cited, and I leave those who are still sceptical to judge for themselves. I claim for geometrical drawings, that they possess every advantage of perspective ones, and besides this are description, measurement, and picture all in one. The eye of the most practised craniologist may easily be deceived by peculiarities of contour and surface; it is therefore no small advantage that geometrical drawings can be compared by simple superposition, and thus minute differences of form detected, which must escape every other method of observation. It is another advantage of the highest practical importance that these drawings can be prepared with all necessary accuracy by persons totally ignorant of drawing. Of course this applies to outline drawings only, which are, perhaps, after all, of the greatest value. A slight amount of shading may be necessary, but this may be learnt with very little practice.

The writer in the *Natural History Review*, already alluded to, states that "no drawing can really represent more than a single plane so as to admit of distances being measured on it." This is manifestly incorrect. Geometrical drawings admit of accurate measurement in EVERY visible plane of the object *parallel* to

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the drawing. It therefore does *not* follow, as argued by this writer, that all the objects proposed by geometrical drawing will be answered by having figures of each plane, in which it may be desired to take the measurements. Besides the objections to perspective drawings already pointed out, if we take figures nearly the size of nature by the aid of the camera lucida, the skull has to be placed so near as to produce a foreshortening amounting to actual distortion.

Let it not be supposed that I am advocating a system which has not been tried. The plates of the *Atlas der Craniοscopie* of Carus, the *Crania selecta* of Von Baer, the *Crania Germania* of Ecker, *Morphologie der Rassenschädel*, and *Zur Architectur des Menschenschädel* of Lucae, and the magnificent work of His and Rütimeyer, the *Crania Helvetica*, consisting of one hundred and sixty-four figures of skulls the size of nature, are all drawn on the geometrical, not the perspective, principle, and are, as a matter of fact, setting aside the question of projection, almost the only published figures of skulls sufficiently accurate for scientific purposes, although there are certainly many extremely beautifully executed and artistic drawings, the value of which, especially when supplemented by geometrical outlines, I should be the last to deny.

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XIV.—*On Hindu Neology.* By Major Samuel R. I. Owen, F.L.S., F.A.S.L., Assoc. King's College, London.

We have already heard much of the Hindu as a Phallic worshipper, and as one bound down by superstition. I now wish to bring him to your notice as one, at least, making an effort—and it appears to me a very grand effort—to free himself from this mental slavery. Truly, "it is written," has been the weapon alike used in the east and west to stay science in her search after facts. It is some years since we in Europe began to throw off our chains. Astronomy was the early battlefield; and I wish to show you that the same strategic ground has now been taken up by the more advanced of the children of Brahma. In 1862, while residing at Benares, the seat of Hindu learning and orthodoxy, I was invited to attend the reading of a paper at a society got up by, and exclusively composed of, Hindus. This society could then show the names of sixty-four members on its list. I am personally acquainted with the President, Rajah Deo Narain Singh, who is a member of the Governor-General's Council; also with the Vice-President, Secretary, and some of the other members of the society, and believe them to be men of position and education. For at least two years previously, there had appeared strong indications of unrest in the minds of some of the better educated Hindus of the place, and the present subject of communication may be considered a very good sample of the result. Before this time, 1862, it is highly probable that had a man been found to write such a paper, an audience would have been wanting to hear it read.

The author, Pundit Bapu Deva Sastri, a Maharatta, is Professor of Astronomy, Mathematics, and Sanscrit at the College of Benares. The object of the paper was to show the astronomical errors in their ancient scriptures, the Sastras, comparing what is there written with the established facts of

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science, and calling especial attention to the precession of the equinoxes, not there taken into account; and the results that arise in the course of long periods by the computation of time, when this movement of the heavens is not attended to; and how the fasts and festivals have thus been made to fall at wrong seasons.

His ideas, in common with the rest of the Hindus, as to the day and night of the gods; how certain prayers and oblations are only appropriate to certain times, and the inconvenience and loss to believers that will result through offering up these when, as he says, it cannot benefit them; how he uses this *argumentum ad hominem* for the purpose of making his hearers sympathise with him in his wish to set them right on these vital points; and how he, as a worthy follower of Brahma, is most anxious to conciliate and please the gods, is well worthy of notice and comparison.

Every movement that is before the age meets with an active opposition, and so have the opinions of this worthy Pundit and his friends. If the Anthropological Society has to contend against this *vis inertia*, conceive what an amount of *vis viva* must have been exerted to set in motion such a ponderous mind as that of the Hindu,—a mind comparatively stationary for ages, and to which has clung abundance of stagnant vegetation.

In Europe, it has not only been sought to reconcile the text of Scripture with astronomy and geology, but to prove the truth of its inspiration on astronomical and geological grounds. The author of this paper, in like manner, often quotes the Sastras in his own vindication and support, and backing himself up by one text, he hopes to show the error in another, without doing so great a violence to the feelings and prejudices of those who are only beginning to feel the force of facts and inductive reasoning in antagonism to the authoritative "*scriptum est.*" Few of the Hindu world can be much further advanced than this (I wish it to be understood that I am alluding to the Hindu Proper, not to the Bengalee).

He complains that the positions of the planets, as calculated by their own rules, are wrong. I have had sufficient testimony of the truth of this assertion. Aishwarj Singh, the

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secretary of the society, brought to me his own nativity for examination. I found the position of Mercury to be out about four degrees, that of Venus about two degrees, and none of the places of the planets were exactly correct for the time given; this is a matter of some importance to men who place as implicit confidence in the influence of the heavens, as many of us do now in the curative powers of mercury, strychnine, or arsenic, and they adduce the same reason for their faith,—experience.

The author states that astronomical errors will cause their rights and ceremonies to become confused. The gods of the Hindus appear, from what the Pundit tells us, to expect different services during their day, from those to be performed in their honour during the night time,—each of these periods is of six months duration. But these astronomical errors have caused the services to be sadly misplaced; this the Brahminical sage looks upon as a serious matter. We ought to be able to sympathise with him. Conceive us to be placed in a similar dilemma; would not Easter offerings, tendered out of season, be unsavory things? Fancy that very ancient festival being thrown out of its proper season by an error of the astronomer Royal. It having been appropriated* both by the church and by the holiday keepers, each would be interested in such a matter; and so it is in India. The Doorga Poorja is not all prayer and fasting; though the pious Hindu may keep it in that way, the multitude have their melas, or fairs, as we used to have ours in the good old times.

Now this paper, as a paper on astronomy, may not be very interesting to us as anthropologists; but it shows us that the Hindus are diligently looking into what is written in their Sastras, and comparing that which is written with the facts now established by science. A high-caste man, in a good position, dares publicly to say "it is thus written; but this is not true, and we must correct our old scriptures." An influential audience is found to listen to him, and a society not unworthy of our respect publishes his paper. These things are worthy of our notice. If we remain unacquainted with this

* The Druidical ceremonies of Easter—*Eoster* or *Astarte*—date from before the year 1 A.D.

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dawn of a new day in the east, we shall not know that the Hindu race,—a race in which we, as Englishmen, especially take a great interest,—is advancing; at least, the first steps have been taken, in what you will no doubt agree with me in considering, the right direction.

I have said already perhaps more than sufficient to bring this subject to your notice. I will now lay before you the paper itself, in the form of an authentic translation. The secretary, who is son to the Vice-President, and other members of the society, are fair English scholars; it was not, therefore, necessary for an European to Anglicise the ideas when translating; this, I think, a matter of great importance, and adds much to the value of the paper in the form in which I present it to you. My own opinion is that the two races do not think in the same channel. If a thought could be conceived to have two ends by which it may be seized, the Hindu and European would almost invariably take hold of it by the opposite extremities. We all know how different would be the translation of the same work by men of opposite views on the subject treated of; how much more, then, is this to be guarded against when the translation has to be made by one who, perhaps, cannot think in the same train as the writer. I say "perhaps"; for the different psychological powers of the brains of different races or species, if you will, is an open anthropological question, and the very question upon which I am now endeavouring to throw some additional light.

The Sidereal and Tropical Systems. A Lecture by PANDIT BÁPÚ DEVA SÁSTRÍ,

Professor of Astronomy and Mathematics, Sanskrit College, Benares. Delivered before the Benares Debating Club, on the Evening of the 14th October, 1862.

It is a great gratification, gentlemen, that you have expressed to me your desire to hear something on the subject of Astronomy, especially on the sidereal and tropical systems; and according to your wishes I have prepared a lecture on the subject, which I have the honour to read before you to-day. In this lecture you will meet, in some places, with some religious doctrines, for the mention of which I beg you to

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excuse me, as I have brought them forward here to explain certain minute principles of the Hindu astronomy, and all of them aim at the demonstration of the truth.

It is well known that, of all the sciences extant in the world, this science is the most useful, the most astonishing, and the most excellent.

It is written* that "all other sciences are only for the amusement of the mind, and no wonderful result is derived from them, but the science of medicine and the science of astronomy are such that they produce marvellous effects in their every step." It is also said that "even those who, having abandoned the society of their family and of the world reside in the forest, have also need of the astronomer. Had there been no astronomer (in a country), hours, lunar days, the moon's mansions, the sun's northern and southern progresses, and the seasons would have been confused" (that is, nobody would have known them exactly and this would have caused a great embarrassment).

I say this also that, the size and dimensions of the earth, all countries and islands situated on its surface, and their relative distances, are discovered only by the aid of this science. Merchants, for their traffic, visit countries and islands which are far distant from each other with the help of navigation which wholly depends upon this science, and thus people obtain such things and articles, produced in different parts of the globe, which are useful to them and conducive to their health and comfort. The merchants themselves are much profited; different nations contract mutual friendship, and their knowledge is thus increased by mutual aid. The savage inhabitants of distant islands have now learned how to read and write, and this is owing to the art of navigation.

If a man be asked where he lives, to what direction the door of his house lies, and so on, and if he cannot answer these questions, how ignorant will he be considered, and to what ridicule will he be subject. Thus if a man, residing on the surface of the earth, does not know even how large the earth

* The original paper containing the Sanskrit quotations used by the Pundit, has been deposited, by Major Owen, in the library of the Anthropological Society of London.

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is, in what part of it he lives, what countries and kingdoms are in the several directions around him, and whence the numberless stars which shine at night time come, and where they go, he will certainly be considered a very ignorant man. It is a great pity that such men are common in our India; they consider themselves very clever and learned, but they never leave their own home, and consequently know very little about their own country and those of other nations. Some people labour under this wrong notion, that Calcutta itself is the country of Englishmen. Every such man I consider to be like a tortoise in a well, who thinks the whole world is comprised within his well. In our SÁSTRAS, also, such men are much censured, for example:—"That foolish man who, like a tortoise in a well, confines himself always to his home, is despised by his wife on account of his poverty, and always lying down idly near her. He fears all men because he never courts men in authority. Then how is it possible that a man like him should know the wonders of this world and be happy?"

Moreover, that foolish man who, leaving all other business lives always in his house to gaze at the face of his wife, becomes poor and wretched.

Therefore, man should know and see the different countries and kingdoms situated on the surface of the earth, and thus he will be happy and comfortable. As it is written:—"Those men are fortunate who travel most zealously in distant countries, observe their wonders, and return home with great wealth. The members of their families being very anxious to see them on account of their long separation, meet them with eagerness, and thus they become rich, and enjoy greater pleasures than we can express."

The English afford a good example of this, and all owing to the science of astronomy. For, without a knowledge of this science, *i. e.*, without knowing the positions of the earth, planets, and stars, and their exact motions, it is impossible to know about the different countries, kingdoms, and islands situated on the surface of the earth.

The sailors, who direct their ships in the pathless ocean,

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would not be able to find out the right way, and arrive at their desired port, without the help of this science.

Therefore, no other science is so useful as the science of astronomy.

It is a doubtless fact that this science has been in use in India since an early time; but as it depends only upon observations, and no observation has been made here of late, almost all our astronomical works have become incorrect in many places; *i. e.*, the risings and settings of the planets, their conjunctions, and the eclipses of the sun and moon, do not take place at an exact time, and this is a known fact. Now, I will give here, first, a few instances, to show how far the statements given in our old works differ from the facts which have now been well established by means of minute observations.

Statements given in our old works.	*Facts newly Established.*
1. The Earth is fixed and the Sun and other planets move round it.	1. The Earth is a moveable body, it turns about its axis, and revolves round the sun.
2. The diameter of the Earth is 1,600 *yojanas*, or 14,545 miles.	2. The diameter of the Earth is 870 *yojanas*, or 7,916 miles.
3. The diameter of the Moon is 480 *yojanas*, or 4,360 miles.	3. The diameter of the Moon is 238 *yojanas*, or 2,160 miles.
4. The sun's diameter is 6,500 *yojanas*, or 59,100 miles.	4. The Sun's diameter is 97,000 *yojanas*, or 882,000 miles.
5. The distance of the Moon from the Earth is 51,566 *yojanas*, or 468,780 miles.	5. The Moon's distance from the Earth is 26,134 *yojanas*, or 237,580 miles.
6. The distance of the Sun from the Earth is 689,377 *yojanas*, or 6,267,064 miles.	6. The Sun's distance from the Earth is 10,442,154 *yojanas*, or 95,000,000 miles nearly.
7. The dices of the minor planets, Mars, etc.:—	7. The dices of the minor planets, Mars, etc.
Mars ..... 4° 45′	Mars ..... 6″·29
Mercury 6 15	Mercury ..... 6·9
Jupiter 7 20	Jupiter ..... 36·74
Venus 9 0	Venus ..... 16·9
Saturn 5 20	Saturn ..... 16·2
8. Fixed stars are 60 times further than the Sun from the Earth, and they receive their light from the Sun.	8. Fixed stars are at an immense distance from the Earth, but it is established that all of them are not at an equal distance from it. They do not shine with the Sun's light, but they shine of themselves.

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9. The motion of all planets in *yojanas* is equal, and they revolve in circles.	9. The motion of all planets in *yojanas* is not equal, and they do not revolve in circles but in ellipses.
10. The length of a sidereal year is 365 days 6 h. 12 m. 36·56 s.	10. The length of a sidereal year is 365 days 6 h. 9 m. 9·6 s.
11. The Moon's sidereal revolution is 27 days 7 h. 43 m. 19·03 s.	11. The Moon's sidereal revolution is 27 days 7 h. 43 m. 11·54 s.
12. The Sun's greatest declination is 24°, etc., etc.	12. The Sun's greatest declination is 23° 27', etc., etc.

Similarly there are many other statements which differ from the facts which are now well established. But of the latter, such as that the Earth moves, that all the fixed stars shine of themselves, and so on, which are really the facts, and consequently should be granted, are not of this nature that the denial of them would cause any gross error in the calculation. For this reason, our old astronomers said nothing about the earth's motion. But I can prove this, that they conceived the idea of the earth's motion when they composed their works. But this is not so easy a subject that I can explain it here. Our old astronomers said that the sun revolves round the earth only for this reason that it appears to do so, no palpable error occurs by this assumption, and the student feels no difficulty in knowing the doctrine of the sphere. Therefore, if such facts be not granted, no loss whatever is felt by the people. But there are certain things in this science, such as the greatest declination of the sun, his sidereal revolution, etc., which necessarily undergo a change in time, as it is written, also, in the VASISHTHA-SIDDHÁNTA, (The saint VASISHTHA says to the saint MÁNDAVYA) Oh MANDAVYA, thus have I declared to you briefly the science stated by MAYA (a demon), and this will slacken in the course of time, on account of the motions of the sun, moon, etc., *i. e.*, it will undergo a certain change. Then such facts, and those which are erroneously stated at first, must be corrected; and thus we ought to make our calculation in such a way that it will agree with the phenomena which occur in the heavens. It is said that—

In any time, the lunar days, etc., ought to be calculated according to the data of any work which agree with the observation made at that time. Accordingly GANESA DAIVAJNA, a

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great astronomer, having corrected the motions of the planets, which he found wrong in the old works, with the aid of observations which he made with his available instruments, then stated them in his work called GRAHALÁGHAVA, which almost all HINDU astronomers of the present day follow, and calculate the places of the planets according to the data given in it. For this reason, those parts of our old works which have become wrong by the course of time, must be corrected, otherwise this science will be useless, and all the rites and ceremonies of the Hindus will be confused. Now, if some persons ask on what ground they should grant the veracity of the facts newly established, because only assertion is made here and no proof, and say that it must not be asserted without some strong proof that the statements in our old works are wrong, and that those which are newly established are right,—I say in reply to this that I can give proofs and demonstrations of the facts newly established, but I cannot give all of them here. I can say only this at present, that there is no doubt that the places of the planets, the time of their conjunctions, etc., calculated according to the data given in our old works, often fail, *i. e.*, they do not take place exactly, and it follows from this that there is certainly some error in the data given in our ancient treatises. Now, if there be any doubt about the truth of the facts newly established, there is a book called the Nautical Almanac, which is printed every year, and in which declinations, the times of the affections of the planets, etc., are written down for every day, and they are seen accordingly in the heavens. If anybody wishes to convince himself of this, let him examine them, and thus know the truth of the facts newly established.

Now, besides the errors above stated, there is another error in our works, which is as follows.

The circle in heaven, called the ecliptic, is equally divided into twelve parts, which are called Aries, Taurus, etc., respectively. But this division is twofold, one being as follows. Having assumed any point of the ecliptic as a fixed origin, the circle is divided from that origin into 12 equal parts, which are termed fixed or stellar signs, and the times in which

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the planets enter into them are called the stellar entrances. And the other division is that from one of the two points in which the equinoctial and the ecliptic cut each other, and from which the ecliptic lies north to the equinoctial, twelve equal parts of the ecliptic are supposed, which are moveable on account of the retrograde motion of that point (which is known by the term precession of the equinoxes). Hence these parts are called moveable or tropical signs, and the times in which the planets enter into them are called the tropical entrances.

Now, the latter division, or the tropical system, is called the more important in our SÁSTRAS, and not the former, or the sidereal system, and it is right, also, as the following statement of VASISHTHA (one of the great saints) shows:— That every time in which the Sun enters one of the moveable signs is his entrance, and his stellar entrance is useless. Some Pandits say that the stellar entrance gives virtue, but VASISHTHA says that this is not his opinion, because it is not according to the position of the ecliptic.

The saint PULASTYA writes:— "The sun's northern and southern progresses in the heaven are always according to the tropical system (and hence the tropical entrance is more important and), the stellar entrance is of less importance. The ways to find them both are alike. The man who bathes, gives donations, prays, performs funeral rites, burns offerings, etc., in the sun's tropical entrance, obtains such virtue as is never destroyed."

It is written, also, in the ROMASA-SIDDHÁNTA:—"The length of day and night are not determined according to the sun's stellar entrances (but they are settled according to the sun's tropical entrances), and as all religious rites, offerings, etc., depend upon the lengths of day and night, the sun's tropical entrance is virtue-giving."

It is stated in our SÁSTRAS, that "the length of one year of men is the length of the day and night of the gods, and the proof of this is given as follows: That the gods reside upon Mount MERU, situated at the north pole of the earth, which is exposed for six months to the sun, and turns aside from him for other six

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months. Hence the gods have their day of the length of six months, and their night of the same duration, *i. e.*, they have their day and night of the length of one year of men. But this year is the tropical one and not the sidereal, and hence the tropical system is more important. It is plain, from the consideration of the verses of the SÚRYA-SIDDHÁNTA, from 45th verse of 12th Chapter, that the year, the sun's northern and southern progresses, and the seasons are tropical, and the reckoning of the signs from the vernal equinox is the more important.

Now, as long as the sun lies to the north of the equinoctial, the north pole of the earth is exposed to him, and consequently the gods have their day at that time; and as long as the sun is to the south of the equinoctial, the north pole of the earth is turned aside from him, and then the gods have their night. Though this is the case, still it is written in our SANHITÁ works, that the sun's northern progress is the day of the gods, and his southern progress is their night. This is written with this view, because the religious rites of the day-time are said to be observed from midnight to midday, and those of the night time, from midday to midnight; and as the sun's northern progress commences from midnight of the gods and ends at their noon, that time, *i. e.*, the sun's northern progress is therefore given as their day; and as the sun's southern progress begins from their noon and terminates at their midnight, that time, *i. e.*, the sun's southern progress, is said to be their night, for the performance of the religious rites at their proper time. For this reason, all the holy rites are said to observed in the sun's northern progress, and others in the sun's southern progress. But as the sun's northern and southern progresses, which are the gods' day and night respectively, according to the opinion of the authors of the SANHITÁ works, are according to the tropical system, hence the tropical system is an important one.

Thus the tropical system is called the important system in our SÁSTRAS, on account of the above-stated and several other reasons; yet the sidereal system is in use now-a-days, and the reason of this is as follows. Formerly, when the first point

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of the stellar Aries and the vernal equinox were coinciding with each other, both systems were the same. But after that time, no attention was paid to the notion of the equinoxes, and therefore the unimportant sidereal system continued. Now, it is to be observed here that, even admitting the unimportant sidereal system, the first point of Aries, or the origin of the fixed signs, cannot be determined, which is shown as follows:—

It is stated in the SÚRYA-SIDDHÁNTA, and other works, that the sun requires 365d. 6h. 12m. 36·56s. to complete his sidereal revolution. But this period is nearly 3 minutes more than the exact period; and it is plain from this that when the sun's sidereal revolution, as stated in our old works, is not correct, his place, determined through these data, will not be correct, and consequently the origin of the ecliptic cannot be determined through these. This is the case with the places of all other planets; and for this reason, not one of them is fit for the determination of the origin.

In the same manner, the origin cannot be determined through the longitudes of the principal stars of the asterisms. Because the longitudes and latitudes of the principal stars, stated in our works, differ from those which are now determined through the best observations. For example, the principal star (β Arietis) of the ASWINÍ, the first asterism, is about 2° forward from the place stated in our works; that (α Muscæ) of the BHARANÍ, the second asterism, is $2\frac{1}{4}$° forward; that (α Orionis, or the ÁRDRÁ, the sixth asterism, is about 3° forward; that (α Virginis Spica) of the CHITRÁ, the fourteenth asterism, is 3° forward; that (ι Libræ) of the VISÁKHÁ, the 16th asterism, is $2\frac{1}{2}$° backward, and so on. In like manner there is much difference in the latitudes also. Hence, the origin of the ecliptic cannot be determined through the longitudes of the principal stars stated in our works. Thus, the origin of the ecliptic, from which the places of all planets are reckoned, can by no means be fixed, and this is a great mistake in our works.

Therefore, I say that as the stellar entrances of the sun cannot be known (without determining the origin of the ecliptic), the sidereal signs are not according to the position of

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the ecliptic; they do not at all depend upon any of the principles of the doctrine of the sphere, the year, the sun's northern and southern progresses, seasons, lunar months, and day and night, whether ours or the gods' are not according to the sidereal system, but to the tropical; and hence the sidereal system is called less important in our SÁSTRAS; the religious ceremonies or rites, therefore, are not performed, now-a-days, at the proper times, and this is a great fault.

Therefore, as the sun's entrances can be determined exactly according to the tropical system, which is reasonable, and authorised also by our SÁSTRAS, the astronomical calculation ought to be made according to this system.

Thus, as the tropical entrances are reasonable, and called the more important, the lunar months, CHAITRA VAISÁKHA, etc., which come according to the sun's entrances into the signs Aries, Taurus, etc., ought to be taken according to the sun's tropical entrances, *i. e.*, the lunar month in which the sun enters into the first tropical sign is CHAITRA, that in which the sun enters into the second tropical sign is VAISÁKHA, and so on. This reckoning of the lunar months is right, because it is stated in our SASTRAS that the month CHAITRA is in the spring, which always commences at the time when the sun enters into the first tropical sign. Therefore, that lunar month ought to be taken as CHAITRA, in which the sun enters into the first tropical sign. In like manner, all other seasons become according to the tropical system, and hence the other lunar months VAISAKHA, etc., ought to be taken according to this system. But if the lunar months be not taken according to the system, the spring will take place in the months MAGHA, PAUSHA, etc., on account of the precession of the equinoxes, and thus there will be great disorder. Now, if anybody says that the vernal equinox recedes only 27° and then returns, *i. e.*, it librates, as is stated in the SÚRYA-SIDDHANTA, and other works, and thus the spring will never take place in the months MAGHA, PAUSHA, etc. I say this to him that it cannot be so, because MUNJALA, and other astronomers, have stated in their works that the vernal equinox completes its whole revolution, and does not librate; and this only is reasonable, and not the

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statement that it librates. Therefore, the spring will necessarily take place in the above said months by admitting the sidereal system. Then, without knowing the principles of the science of astronomy, people will say that the horrible iron age has arrived; signs of one time are seen in another time. For this reason, I say that all we HINDUS ought to try to correct our old works on astronomy. If any obstinate man says that although the opinion of MUNJALA is reasonable, still he will not admit it, because MUNJALA was not a saint; to this I say, that he is quite wrong, because the great saint VASISHTHA says in the YOGAVASISHTHA, 2nd verse, 18th section of the Chapter called MUMUKSHU-PRAKARANA:—

"That science, which is reasonable, ought to be accepted, although it be the production of a man, and not the unreasonable, though it be composed by a saint; and thus it is proper to have recourse always to the right path." Again, he says in the 3rd verse:—

"The well-founded statement ought to be adopted, though it be given by a boy; and that which is not so, we should abandon, considering it like a straw, though it be uttered by the god BRAHMA."

If the obstinate man still say, that whatever mistake there may be in the old astronomical works, he will not grant it, he will accept what his forefathers used to accept, and that he cares very little about reasonable and unreasonable doctrines. In reply to this I write what VASISHTHA says in the 4th verse of the same section:—

"That bigoted man is intolerable who drinks the water of a well because it belonged to his father, leaving the pure water of the Ganges flowing in the front."

Therefore, I beg, gentlemen, that those errors which can be well established by the authority of our SASTRAS, and several other reasons, may be corrected.

Thus, I have expressed before you my inward feelings, and if there be any harshness of speech in expressing them, I pray you to pardon my unintentional offence.

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XV.—*Notice of the Brochs and the so-called Picts' Houses of Orkney.* By GEORGE PETRIE, Kirkwall, Local Secretary of the Anthropological Society of London, Fellow of the Royal Society of Northern Antiquaries, Copenhagen, etc., etc.

THE Orkneys are rich in Archæological remains. Traces of the early inhabitants are found in every island, and most interesting relics are continually turning up.

Besides the ordinary barrows, or grave-mounds, there are very many tumuli which, on examination, are found to be ancient structures more or less in ruins. These and the barrows are, however, so very much alike in external appearance, that an unpractised eye cannot distinguish the one from the other. It is only when the tumulus has been dug into that its true character is discovered. But even then there is very often the greatest difficulty in ascertaining the class to which the building belongs, when the description of the discovery is communicated by a person who does not know, or who forgets that the name *Pict's house* is applied indiscriminately, in the northern counties of Scotland, to every sort of ancient structure. To prevent such confusion, the appellation "Pict's house", is restricted, in the following notice, to a peculiar class of buildings very common in Orkney, and of which one, opened by me in 1849, near Kirkwall, and to be afterwards noticed, may be taken as the type.

The tumuli in Orkney contain several varieties of buildings. The most remarkable of these, for size at least, are—

THE BROCHS.—The "Burgs" or "Brochs" are circular towers, generally varying from fifty to seventy feet diameter, from outside to outside of wall of tower. None of the ruins of those in Orkney, that have yet been examined, exceeds sixteen or seventeen feet in height. The circular wall is from twelve to fifteen feet thick, and is generally a solid mass of masonry

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to the height of twelve feet, or thereby, where it is found to form two concentric walls, with a gallery or passage between them. I have observed this construction in several brochs, and I have found also that it exactly corresponds with some of the Shetland brochs, which are less ruinous than those in Orkney. In fact, while the *broch* of *Mousa*, in Shetland, is nearly perfect, and others in Shetland show a large portion of the original structure, it is *only the lower storey* of the *Orkney brochs which remain*, as will be seen by comparing the plans, etc., of the Burray and Mousa brochs on the diagram No. 1. There are, in the Orkney brochs, generally a few chambers or cells in the thickness of the wall, and also a staircase leading upwards, apparently to the gallery, which, as already stated, commenced at a height of about twelve feet above the level of the floor of the enclosed area, or interior. But the upper portion of the building has, in every case in the Orkney brochs, been thrown down. The *débris*, however, within and around the towers, leaves no doubt that they were as high, and probably some of them higher, than Mousa, which is upwards of forty feet in height.

A very good specimen of the Orkney class of broch was opened in the Island of Burray, some years ago, by James Farrer, Esq., late M.P. for South Durham, and plans and measurements were carefully made by me at the time (see diagram No. 1). The tumulus was of great extent, upwards of twenty feet high, and stood near the seashore. It presented the appearance of a grass-covered mound, surrounded by a large embankment, of a sort of horseshoe figure, the heels or ends facing the beach. A portion of the wall (A), being very ruinous, was removed, and the interior (B) of the tower cleared of the stones and rubbish with which it was filled to the top. The chambers C, D, E, F, and G, were successively discovered. The roof of the chamber, F, was wanting, and the chamber C was partially destroyed when the wall at A fell. The well (?) (H) was discovered by the accidental displacement of a stone at I. One of the stones of a "quern", or handmill, lay near the bottom of the well, to which rude steps led down; but there was no water in the well. It is about ten feet deep,

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measuring from the highest point of the interior of the roof. A subterranean passage leads from the "well" in the direction of the doorway of the tower, and probably had its mouth, or entrance, within the doorway, but the passage has not yet been traced out. I may here observe, that although there can be little doubt that what has been called a "well", is really so in some of the brochs; yet, in the case of others, it can hardly be called a well, but seems to have been a mere hole made under the floor, probably for concealment of objects of interest or value.

The doorway, or entrance passage, which is the only external aperture in the tower, is fifteen feet long, about four feet wide, and six feet high. It is narrowed by two stones set on end as jambs, one on each side, and projecting slightly edgeways into the passage, about four feet and a half from its inner extremity. A little behind these jambs, on their *inner side*, there is a hole in the wall, apparently to receive a strong bar; and above is seen an opening between the lintels, or covering stones of the passage, through which a movable door of wood or stone might have been let down from the recess above (see i, section 1 and 3,) behind the jambs, and secured by the bar. This door seems to have been further guarded from the chambers C and D, both of which have their entrances only three feet high, opening into the main entrance, or doorway of the tower, a couple of feet, or thereby, outside of the jambs. An intruder could have been effectively annoyed or slain from these chambers, whose occupants would remain invisible, while they could easily see what was going on in the passage.

The tower seems to have been in use for a long period; for the large, hard "old red sandstone" lintel over the entrance of the chamber E, had been worn away so much on its lower side, that it had broken across, and a stone had then been placed as a prop under the broken part, where it still remains. The embankment, also, evidently formed no part of the original design; for as will be seen on the ground plan, it runs across and close to the doorway, almost shutting it up. It appears to have been raised to defend the occupants of the

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tower from attacks on the land side, while the side fronting the sea was left unprotected. It was, therefore, probably made by some marauders who had landed on the island, and forcibly obtained possession of the tower; or finding it ruinous and unoccupied had seized it, and surrounded it with the rampart to defend themselves from the inhabitants of the island. Be that as it may, there are abundant evidences in many of the Orkney brochs, as well as in those of Shetland, that they were used by many successive occupants, who from time to time erected walls across the interior, diminished the size of the enclosed area, and otherwise altered the internal arrangements of the building, besides adding various external defences. It is also worthy of notice, that the entrance or doorway, as originally constructed, does not seem to have been specially adapted for defence. In almost every case of the kind which has come under my observation, most of the defences do not appear to belong to the original structure, but are later additions. A square, marked off by stones set on edge in the centre of the broch, indicates the hearth, and the space is filled with ashes, mixed with fragments of bones. A small quantity of charred barley was found, lying on a mass of clay, on the floor of the broch of Burray.

During the process of clearing out the interior of the broch, the following were the principal articles discovered, viz., several stone vessels of various sizes; a stone lamp; a broken circular disc of micaceous schist; a miniature quern; circular perforated stones and bones; a bone scoop; a drinking cup, formed of a vertebra of a whale; five bone combs; two bone pins, one an inch and a half, the other three inches and a half long; several pointed bones, with and without heads; a fragment of fine earthenware, supposed to be Samian; a portion of a bone arrowhead; a bronze pin, an iron knife, and a chisel-looking implement. The iron relics may be of a comparatively modern date, and have accidentally been dropped among the ruins. There is nothing, however, in the facts or circumstances which have been stated to warrant the adoption of any definite opinion as to the probable age of the brochs of Burray; and were it not that another of those interesting

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buildings was discovered in peculiar circumstances, which indicate a considerable antiquity, they might have been set down as much more modern than they really are. The *broch alluded to* is that of *Okstro*, in the parish of Birsay. Some years ago, the intelligent tenant of the farm on which it was found was in the act of removing a vast heap of stones from an elevated piece of ground in one of his fields, and while doing so, a number of flat stones were discovered. These, on being raised, proved to be the covering stones of cists, about two feet and a half long, formed of undressed flagstones; each contained a small quantity of fragments of burnt bones, and sometimes ashes. There was a great number of these cists, and in one of them I found a small bronze finger ring. Other bronze relics were subsequently picked up. On removing the cists and earth beneath them, the ruins of a large broch were discovered. It was of the unusual diameter of seventy feet. A great number of stone and bone implements have since been taken out of the ruins.

Here, then, we have a broch originally, no doubt, forty or fifty feet high, not only in ruins, but the whole removed, except about six or seven feet height of wall, and earth accumulated above the ruins to a sufficient depth to permit the deposit therein of stone cists belonging to the bronze age. This clearly proves that "*Okstro Broch*" is very considerably older than the cists which were found above its remains. The antiquity of the Orkney brochs is therefore indisputable; but how far back that antiquity may extend, has yet to be discovered.

Both silver and gold trinkets have been found in a broch in Orkney; but judging from the circumstances in which they were discovered, they had most probably been deposited there for concealment at a comparatively recent date.

There are, at least, the ruins of forty brochs in Orkney, and doubtless there are many more. The greater number are still unexplored. There are also many in Shetland. They generally stand in commanding positions; such as near the seashore, the margin of a lake, or on a hillside slope. In this respect they resemble the so-called Picts' houses, about to be

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described. They are also so situated that a signal could have passed along several of them almost instantaneously, thus proving that their original occupants acted in concert, and probably signalled to each other on the approach of danger.

The brochs are also found in several of the other northern counties of Scotland. It would be interesting to ascertain their geographical distribution, as much light might thereby be thrown not only on the brochs, but also on the early history of the north of Scotland. This will, however, be difficult to accomplish until more care be taken in giving descriptions of these ancient structures. Thus, for example, the brochs and the Picts' houses, or conical buildings, are often confounded together, the two being held to be identical; that, however, is a mistake, for they are very different in type. The *broch* was a circular tower, fifty or sixty feet in diameter, rising to the height of forty or fifty feet, and open at top; whereas the so-called *Pict's house* closely resembled a bowl-shaped barrow, and was only ten or fifteen feet in height.

The building at Kettleburn in Caithness, explored by the late Mr. Rhind of Wick, was very delapidated, and the walls were incomplete. The interior appeared from the description given to have been converted into a number of chambers, by the erection of walls in various directions, across the area enclosed by the circular wall of the broch or round tower, which formed the original building. This gave to the ruins (to one who was not familiar with the structure of the brochs) the appearance of a so-called Pict's house. One at least of the brochs opened in Orkney, and of which I made plans, now before me, closely resembles the Kettleburn building in its internal arrangements, and yet that it was a broch was beyond all dispute. But the enclosed area had been subdivided by additional walls of a later date into numerous chambers, which gave it a singular resemblance to the building at Kettleburn.

The class of buildings to which I have for many years restricted the appellation of *Pict's house* have been very different from the brochs both in external appearance and general structure and arrangements.

PICT'S HOUSES.—The *Pict's house* is generally of a conical

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form, and externally closely resembles a large bowl-shaped barrow (see ground plan and sections, diagram No. II). It consists of a solid mass of masonry, covered with a layer of turf, a foot or more in thickness, and has a central chamber surrounded by several smaller cells. The entrance to the central chamber from the outside, is by a long, low narrow passage; while the cells are connected with the chamber by short passages of similar dimensions to the long one. The walls of the chambers and cells converge towards the top, where they approach so closely, that the aperture can be spanned by a stone a couple of feet in length.

While implements and utensils in great variety are invariably found in the brochs, I do not know of any case in which a single implement or utensil was discovered in a "Pict's house." The central chamber of the building on Wideford Hill (of which a plan is given) was nearly filled with stones and earth, plentifully intermingled with bones of the horse, the *Bos longifrons*, swine, and sheep. The bones of the larger animals were next the floor of the chamber, those of the bos longifrons, including those of the head, were found in the entrances to the cell B. No human bones were found. A human skeleton, and several detached human bones, as well as bones of animals and birds, are stated by Dr. Barry, in his *History of Orkney*, to have been found in a large Pict's house at Quanterness which still exists, but the entrance is choked with rubbish. It has been conjectured that the skeleton had been placed in the central chamber long after the building had been abandoned as a residence, which, it is taken for granted to have been. But there is no evidence of this, and the facts about to be stated rather go to prove that the *Pict's houses were tombs*, or chambered cairns or barrows.

The stones and earth in the chamber of the building on Wideford Hill, appeared to have been placed there *before* the building was completed or roofed in. I also observed that the smaller cells of the large Pict's house on the holm of Papa Westray, opened by Capt. Thomas, R.N., were filled with stones and rubbish mixed with bones, and as the rubbish reached above the level of the entrances, as I ascertained by

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pushing in my arm, it can only be supposed that when the cell was nearly finished, the stones, bones, etc., were then deposited in it, and the roofing afterwards completed. This overturns the opinion that those buildings were habitations for the living, and appears rather to indicate that they were tombs for the dead. In further support of this idea I may mention that a party of the labourers who were employed by Mr. Farrer in 1861, to open the *Maes-how* tumulus, were told off to explore a smaller mound, on the margin of a very large quarry, from which it is conjectured that some of the stones forming the circle of standing stones of Stenness were taken. The mound was found to be a chambered barrow exactly resembling in construction the ordinary Pict's house, with the exception that, instead of the chambers having converging walls formed by the overlapping of the successive courses of stones, they were formed by large flagstones set on edge. The rest of the building was of solid masonry, and was surrounded also by a low facing or wall, exactly as in the case of the Picts' houses. There was also a low narrow passage leading from the central compartment to the outside of the structure, but so small that no human being could have even crawled through it. In the central cell lay a rudely-formed lance or spear-head of flint, having on each side fragments of coarse pottery, apparently remains of small rudely ornamented cups: and portions of skulls and other bones of human skeletons were found in the surrounding cells. The pieces of skulls were very thick and massive, but extremely friable and decayed. Some years ago I found a barrow near Kirkwall with a similar internal arrangement. There was also a very small passage, or rather drain, about four inches square, leading from the central cist or cell to the outside of the barrow, and filled with gravel; in fact, these passages seem to have been intended for draining off the water which might get by chance into the interior. All this points to a sepulchral character for the so-called Picts' houses. And in still farther corroboration of this, it may be mentioned, that when the now celebrated tumulus of Maes-how was opened, we found that the floor of the passage from the central chamber to the outside was covered

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with a layer of stones, similar to those used now for drains, to a depth of eighteen inches. That they formed part of the original design of the structure I have little doubt; that they still remained undisturbed while the rest of the building had been ransacked, is easily explained. The building had been broken into from the top or roof, and as it was only in the chambers, and especially in the central chamber, that treasure would be looked for, the stones in the passage (which could easily be seen was also floored with pavement) were left in their original position. A few fragments of human bones were found in the *débris*, but their scarcity is easily accounted for.

There was clearly a link of connection between the barrows I have referred to, as having passages or drains leading to the exterior, and the so-called Picts' houses, and the large chambered building of "Maes-how," of which a ground plan and vertical sections are given in diagram III. It has been objected, that if the "Picts' houses" and "Maes-how" were sepulchral, human remains would have been found in them. The answer is briefly this; that the larger tumuli readily attracted attention, and were at once pounced upon and robbed of their contents, and the bones no doubt scattered about, while the smaller barrows escaped notice, and were left unmolested. The objection is therefore of little weight, and, at all events, is not sufficient to overturn the apparently well-founded opinion, that the so-called Picts' houses of Orkney were simply chambered barrows or tombs, and that "Maes-how" belongs to the same class, but as the grave of a great chief or warrior was more carefully and elaborately constructed. The absence of implements of any kind is a much stronger objection to the opinion that the Picts' houses were habitations, as implements and utensils are invariably found in the brochs and subterranean buildings, and had the Picts' houses been of the same character we would expect to find similar relics in them. Further researches, will, it is hoped, remove all doubt on the subject. If one of the most entire of the Picts' houses were selected and thoroughly cleared out and explored, and its external structure carefully examined, a clue might be obtained to their history, but they are rapidly disappearing, being swept away to make room for

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agricultural improvements, and in a short time scarcely a vestige of these interesting remains of the early inhabitants of Orkney will be left.

There are many other facts connected with the brochs and Picts' houses which might be stated did space permit; but as this notice has been extended to undue limits, I am now merely to refer to the discovery of various characters cut on the walls of a Pict's house on the holm of Papa Westray, and shown at No. 4, diagram 1. Concentric circles were also found on a stone in a chambered barrow opened near Kirkwall some years ago; and on a stone found in the wall of a broch in the parish of Firth. Another of the figures was cut on a stone found at the same broch, and also on a stone in a barrow containing cists with burnt bones in the parish of Deerness. All these I examined myself, and the finding of such characters in the brochs, Picts' houses, and barrows, appears to show a connection between the three, and suggests the idea that they are the remains of one and the same people.

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XVI.—*Report on the Ancient Remains of Caithness, and Results of Explorations, conducted, for the Anthropological Society of London, by Messrs. Joseph Anderson and Robert Innes Shearer, in* 1865. By Joseph Anderson, Local Secretary of the Anthropological Society of London.

The readiest classification of the ancient structures of Caithness is that in use among the country people, who, both in Gaelic and English, have divided them into two groups, which they distinguish as the "grey" and the "green cairns". The "grey cairns" are, externally, simple mounds or heaps of gathered stones, grey with age, and a scanty covering of lichen. The "green cairns," on the other hand, present externally all the characteristics of a simple tumulus of earth, though frequently at some point or other their internal structure of stones crops out through the turf. Structurally, however, when the interior is laid open, there is no general resemblance of plan between the two classes; and the very marked difference in character, both of the structure and contents of the "grey" and "green cairns", bears out the classification as being in the general a good one.

The grey cairns are, for the most part, conspicuous objects in the surrounding landscapes. They are often perched on the tops of the highest hills, sometimes located in the midst of a vast moorland waste. The green cairns, on the other hand, are most frequently found along the seashore, by the banks of rivers, or around the margins of the lochs. Very often their sites point out the most fertile soil, and the most favourable location in the district round. And this harmonises well with the popular belief expressed in the special designation of the green cairns as "Picts' Houses", and the grey ones as "Picts' Cairns",—a designation which again, in the general, marks out pretty correctly, the special purposes of the two classes of structures. For it holds good, that

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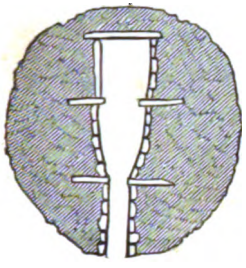
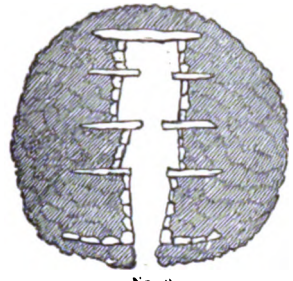
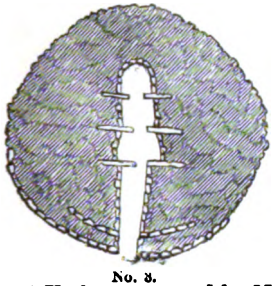


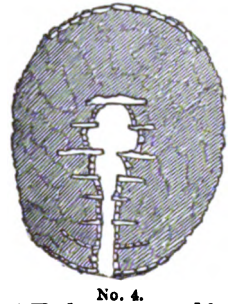
No. 1.
Cairn at Yarhouse, opened by Mr. RHIND. Scale $\frac{1}{100}$



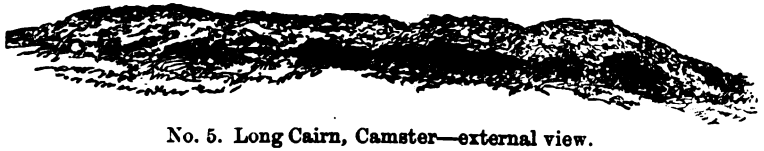
No. 2.
Cairn at Yarhouse, opened by Mr. RHIND. Scale $\frac{1}{100}$



No. 3.
Cairn at Yarhouse, opened by Mr. RHIND. Scale $\frac{1}{100}$



No. 4.
Cairn at Yarhouse, opened by Mr. RHIND. Scale $\frac{1}{100}$



No. 5. Long Cairn, Camster—external view.

No. 6. Long Cairn, Yarhouse—ground plan. Scale $\frac{1}{1440}$

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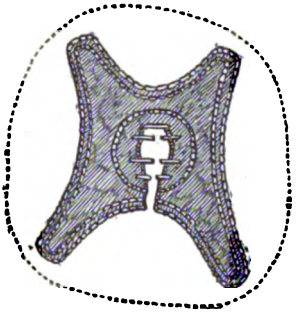
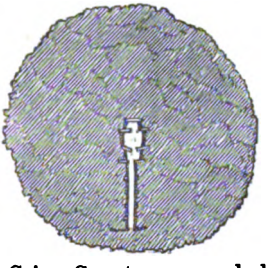
No. 7. Smaller Long Cairn, Yarhouse. Scale $\frac{1}{1440}$

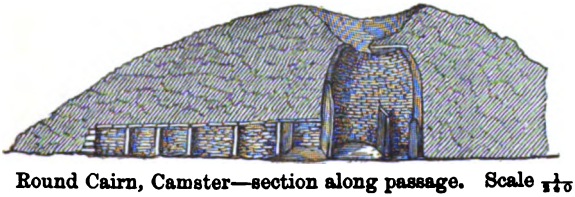


No. 8. Ormiegill Cairn. Scale $\frac{1}{1440}$

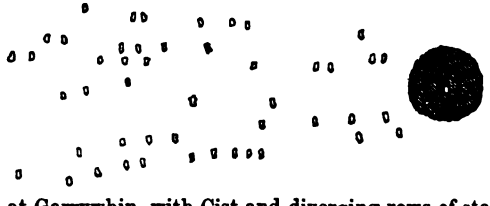
No. 9. Round Cairn, Camster—exterior view.



No. 10. Round Cairn, Camster—ground plan. Scale $\frac{1}{720}$



Round Cairn, Camster—section along passage. Scale $\frac{1}{240}$



No. 12. Cairn at Garrywhin, with Cist and diverging rows of standing stones. Scale $\frac{1}{240}$

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while the green cairns, or Picts' houses (popularly so called), have been invariably used as habitations,—though sometimes also found to have been made places of sepulture,—the grey, or Picts' cairns, have invariably been used as places of sepulture; and if ever they were used as habitations at all, they present no such abundant and unequivocal evidences of occupation by the living as the green cairns do.

PICT'S HOUSE AT KETTLEBURN, AND ITS CONTENTS.

Although a very large number of Picts' houses have been demolished in the course of modern agricultural improvements, only one or two have been at all investigated in Caithness. The only one systematically explored during its removal was that of Kettleburn, near Wick, described by the late Mr. A. H. Rhind (1853). Mr. Rhind appeared to have been most anxious to make out the structural plan of the building, but could not determine whether it had been a borg or a simple beehive-house. One of its chambers contained a well, with a good stair leading down to it. Although the superposed structure has long been removed, and its site ploughed over, this ancient well still supplies the cottagers who live close by, in dwellings constructed from the material quarried out of the original building. Underneath, it had a drain to dry the foundation; and Mr. John Cleghorn, who watched the excavations with attention, states, that the construction of the conduit showed a better appreciation of the suitability of the constructive means at their disposal to the end in view, on the part of these ancient drain makers, than is common at the present day. The farmer who makes stone drains now-a-days, shapes the conduit like an inverted V; but the builders of this ancient dwelling made theirs like a V with the small end downwards, and had thus a drain that would never silt up.

The floors and passages were covered with ashes and refuse of food, and a considerable shell-heap was accumulated about the building. The shell-heap contained numerous fragments of pottery, and broken and splintered bones of the *Bos longifrons*, the horse, deer, *sheep*, goat, swine, dog, seal, whale, and some small fishes, like the haddock or young cod. Mr. Rhind

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had the bones determined by Professor Quekett; and among those found in the refuse-heap were portions of two or three human skeletons, that of a child being represented by a broken fragment of a jaw. I have sent, along with the other remains forwarded to the society from Caithness, a collection of bones from this refuse heap, made by Mr. C. W. Peach, in 1854.

The principal manufactured objects obtained by Mr. Rhind, from Kettleburn, are figured, from his drawings, in the Diagram No. I, herewith forwarded. The pair of bronze tweezers and the comb are delineated of the natural size, and also enlarged to show the pattern of the ornamentation. The idea of the artist, who fabricated the comb from a shank bone, was evidently to make a rude imitation of the human hand with its fingers outspread. The objects represented in Diagram No. II were collected (also from Kettleburn), by Mr. C. W. Peach in 1854, and have not previously been figured or described. There is among them a stone vessel similar to a *quaich;* a comb, which has its handle shaped in imitation of a fish-tail; a worked piece of deer-horn, which may have been a weapon-point; an oblong shore-pebble, wasted at the ends by use as a pestle; and two rough unpolished stones, worked at one side to a point, bearing some resemblance to unfinished celts.

PICT'S HOUSE AT BOWERMADDEN.

Mr. George Dunnet, farmer, Hall of Bowermadden, in the parish of Bower, during the past season, trenched over the site of what had evidently been a large borg, or Pict's house, immediately in front of his residence. It was, when he began to it, an irregularly oval mound, rising some eight or ten feet above the surface of the field. It had been used as a quarry to provide stones for neighbouring buildings, long ago. Mr. Dunnet could trace the foundations of the circular wall, but beyond that no part of the structure could be made out. As at Kettleburn, however, there was a well in the centre, with twelve or fourteen steps leading down to it. The well was full of soft black mud or ashes, but was covered up without

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being examined particularly. As usual, also, there was a considerable shell-midden, of the common shore-shells, plentifully intermixed with splintered bones. No collection of these was made. The nearest seashore is about four miles distant.

Mr. Dunnet preserved a number of interesting relics which were turned up during the trenching, and these he has generously presented to the Anthropological Society. They consist of a bronze pin, about three inches long, with an open circular head, having an ornamental portion on the upper part of the circle; a large bead of black glass (?), with its sides compressed into a triangular form, and coated with a white enamel, curiously ornamented with a series of spiral lines, which pass from one compartment of the surface to another; a comb of bone, with an open semicircular handle; two stone spindle-whorls, rubbed smooth, one of which has a false boring in the middle; an oval vessel hollowed out of red sandstone, the hollow measuring about four inches by three, and three inches deep, the sides being about an inch and a half thick, and bearing marks of blackening by fire externally; a rudely cubical block of green stone (?), with a shallow circular cup hollowed out on its upper face; two circular stone balls, about three inches in diameter; and a large disc of red sandstone, about seven inches in diameter and two inches thick, with a hole of about an inch and a half through the centre. This hole, and the interior of the oval stone goblet, appear evidently to have been made by the "picking" of some sharp-pointed instrument. The horns of the deer, of which some specimens have also been preserved, have been *sawn* across with a very blunt saw, the action of which has polished the upper part of the cuts. Several large vessels, hollowed out of red sandstone, were also found, two of which are still used as troughs in the farmyard. One is described as having been hollowed out of a very large block, having a cavity of about two and a half feet long, and about fifteen inches wide at the one end, which was rounded, the other end tapering to a point. This vessel was unfortunately destroyed. A number of querns and quern-stones were also found.

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PICT'S HOUSE AT OLD STIRKOKE.

At Old Stirkoke, about three miles and a half inland from Wick, a borg, or Pict's house, has been partially quarried out for drains by Mr. John Sutherland, farmer there. Mr. Sutherland has kindly given every facility for its examination as his excavations have proceeded, and has carefully preserved the bones and other relics, of which a collection has been sent to the Society. Externally, before it was touched, this borg was a grass-covered mound, exactly similar to the Harbour Mound at Keiss, described by Mr. Laing. It measured 120 paces in circumference at the base, and fifty over the top, the form being that of a truncated cone. The flattened top of the mound was about forty feet in diameter, and its elevation above the level of the adjoining field about twelve feet, some portions of its surface being higher. The structural plan of the building cannot be made out, partly from the ruinous condition of the structure itself, and partly from the way in which it is being excavated. It seems, however, to have had a large circular central space, and round this traces of a double concentric wall are visible, the space between being filled up by a chaotic mass of stones and rubbish. The internal walls present an appearance as if, throughout the whole extent yet laid bare, they had been acted on by a strong fire. Mr. Sutherland states, that he found a square drain under the foundation, but the centre being not yet cleared out, the existence of a well has not been ascertained.

At the north-east side of the mound, from which the excavations commenced, a pretty extensive midden was found, consisting principally of ashes apparently of turf or peat, with wood charcoal, shells, bones, and pottery. Among the bones found here were the pieces of a skull, forwarded along with the other remains. These, with the curiously-hollowed block of sandstone, were found by Mr. Peach. The shells of this refuse-heap were chiefly the limpet and periwinkle, the *Trochus*, *Purpura lapillus*, and *Buccinum undatum*, however, being also very abundant. One or two fishbones occurred, indicating a fish about the size of the haddock. The nearest seashore is

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at least upwards of three miles distant. The bones of animals, mostly splintered, occurred not only on the floor and in the refuse-heap outside the wall, but generally scattered through the *débris* of the structure itself, in the internal space, as if they had fallen down with the stones which filled it up. Many of the long bones are gnawed at the ends, and others bear the marks of teeth, most probably of dogs. They indicate the same animals as those of the Keiss mound, the ox, the sheep (?), and swine being of most frequent occurrence. The horse, deer, dog, and fox are less numerously represented, and bones of birds are only occasionally found. The manufactured objects and implements found here have been a polished bone needle with a round bevelled eye; the half of a beautifully polished disc of mica schist, with garnets in it, exactly similar to one found in a Pict's house in Burray, Orkney, by James Farrer, Esq.; a deerhorn handle, rudely sawn at one end and rounded at the other, the sawing having been done from opposite sides; a tine cut from an antler, as if for a weapon-point; a cubical block of red sandstone, having a hollow of a very peculiar shape, its outline formed by the intersection of a larger and smaller circular hollow, and similar to one found by Mr. Rhind in Kettleburn; stone pestles, or oblong beach-pebbles, wasted at the ends by pounding, similar to those from the shell mounds at Keiss; two stone spindle-whorls, simply chipped to shape, and very rudely bored; a bone bodkin, about eight inches long; and a fragment of some bronze instruments.

BEDS OF ASHES, WITH POTTERY, IN RIVER-GRAVEL.

The burn of Haster passes within a hundred yards of the Old Stirkoke Pict's house, and about a quarter of a mile further down the stream, on the section of the bank where it has cut through its old bed, it has exposed a stratum of ashes about twenty feet long, and from three to six inches in thickness. It lies on the top of the old river gravel, and is covered by two to two-and-a half feet of black earth. A similar stratum, of nearly the same extent and thickness, occurs a little lower down, resting on a bed of coarse gravel, and over-

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laid by a bed of finer gravel, on which is the same thickness of black earth. These beds of ashes contain wood, charcoal, and traces of bones, and they have yielded, to diligent search in the exposed section, a few pieces of pottery similar to that of the Picts' houses. One of these pieces of pottery is full of impressions of the seeds and leaf of some species of grain. No trace of any stone structure is visible in the section. These curious beds of ashes were noticed and examined in the section by the writer and Mr. T. F. Jamieson, of Ellon, when examining the boulder-clay sections of the burn in August last.

GREY CAIRNS OF YARHOUSE, THRUMSTER.

The most remarkable group of grey cairns in the county is that in the Yarhouse Hills, on the estate of Thrumster, in the parish of Wick. Picts' houses, cairns, and standing stones, are numerously scattered all along the east coast of Caithness, but here they are most abundant. Structurally, the grey cairns resolve themselves into two great classes,—cairns heaped over a simple cist, and cairns reared with great labour over a central chamber of a peculiar type. Though the chamber of each separate cairn differs in its details from all the others, there is a striking uniformity of general plan, a typical representation of which is given on Diagram IV, after Mr. Rhind's drawing of the typical ground-plan. He characterised it as "radically cruciform"; but a reference to the ground-plans of the four cairns which he explored, as now laid off to the actual measurements by Mr. Shearer (who assisted Mr. Rhind in his explorations), will show that the cruciform theory is rather a fanciful one. In fact, one of the cairns, the exception which proves the rule, has its chamber divided into only two compartments; and the others, though they have the general tricamerated structure, have certainly nothing cruciform about them when represented according to the actual measurement. This tricamerated arrangement holds good (with the single exception) whatever the external form of the cairn.

The chambered cairn is thus of one type internally, whether the cairn itself be round, oval, or long, horned or without

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horns. A lintelled passage, low and narrow, but widening and slightly increasing in height towards the centre of the cairn, leads into a chamber, divided into three compartments by monoliths projecting from the walls on either side, and leaving a passage of about two feet between them. This tricamerated space, however,—though on the ground-plan it shows always the same arrangement, the central compartment being the largest, and the back one the smallest,—has not always the same appearance from within. In the round or oval-shaped cairns, the first compartment was sometimes lintelled over, while the second and third were formed into a separate chamber, with a (truncated) dome-shaped roof, as shown in the section of the great round cairn at Camster. In this case, the divisional monoliths which separate the second and third compartments do not reach more than halfway to the roof. In the more rectangularly chambered cairns, on the other hand, all the divisional monoliths appear to have served the double purpose of partitioning off the separate compartments, and forming at the same time supports for the roof of flat slabs springing from the side walls, but slightly convergent towards the top.

With the exception of some fragments of pottery, Mr. Rhind found no manufactured objects in any of the chambered cairns he explored. In all, however, he found abundant evidences of their having been used as places of sepulture. With all his care, however, he did not succeed in obtaining a single skull entire. He remarks upon the singularity of the fact, that as many as seven interments could be traced in a single cairn; and that, in the same structure, there was evidence of three distinct modes of burial,—by cremation; in a crouching or doubled-up position between the partitions; and in the passage at full length.

Three years ago, the last of the conical cairns of Yarhouse was opened by J. G. T. Sinclair, Esq., of Ulbster. It was of an entirely different structure from those in the immediate neighbourhood explored by Mr. Rhind, which were all constructed with a chamber and passage; whereas this one was simply a huge pile of stones raised over a kistvaen, composed of very massive slabs. The sides of the kistvaen were unfor-

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tunately so much broken up in the opening, that its dimensions cannot now be accurately ascertained; but it seems to have been at least eight feet in length, about four feet high, and three feet broad. In it were found the skull and bones of a human skeleton, lying on a quantity of seabeach, mixed sparsely with remains of broken shore shells. The site of the cairn is a long way inland, and perhaps three miles from the nearest beach. A bronze spearhead was found along with the bones, and sent to the British Museum.

CHAMBERED LONG CAIRNS WITH HORNS.

Associated with these conical chambered cairns, there was another description of grey cairn of such rare occurrence that only three instances are known in the county,—two at Yarhouse, and one at Camster, associated with the largest conical cairn in Caithness, to be hereafter described. Photographs of the two latter, the largest round, and the largest long cairn in the county, are hereto appended (by the kindness of Mr. Johnstone, photographer, Wick), and they will convey a better idea of the external appearance of the two classes of chambered cairns than any amount of verbal description.

Though the internal structure of the round cairns had been made known by Mr. Rhind, there was nothing whatever known of the structural character of the long cairns, not one of them having been opened. Their uninviting exterior, and the apparent magnitude of the undertaking, would seem to have deterred amateurs and scientific explorers alike from meddling with them; and it was not till last summer, when Dr. Hunt, President of the Anthropological Society, passed through Caithness on an exploring commission to the far north, that the structure of these, the rarest and most singular of the ancient remains of Caithness, was for the first time ascertained. Mr. Shearer had commenced the exploration of the larger long cairn at Yarhouse in anticipation of Dr. Hunt's visit; but it proved a work of such magnitude, that but for the assistance of the grant from the funds of the Anthropological Society, which was at once made available, the thorough investigation of this hitherto unknown class of cairns could not have been attempted.

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Viewed externally, the largest and best preserved of the three long cairns, that at Camster, presents the appearance of a ridge of successive heaps of stones, diminishing in height and size towards the western end. All three lie more or less nearly east and west, though no two have exactly the same bearing, and all three have the highest end looking towards the east. They have at both ends curved, horn-like projections of the structure, falling gradually to the level of the ground, and in all cases quite grown over with turf and heather, although the body of the cairn was bare. The Camster long cairn (not yet explored) is about seventy paces long by about twenty-five paces broad at the base, and may be from 15 to 20 feet high at the eastern end. The larger of the two at Yarhouse, Thrumster, measures 240 feet lengthwise, from the lines of the tips of the horns; the breadth of the base of the body of the cairn at the eastern end is 66 feet, and at the western end 36 feet, the horns expanding with a curve so as to make the line across their tips, at the eastern end, 92 feet, and at the western end, 53 feet. The smaller cairn, measured in the same way, is 190 feet long; the breadth of the base of the body of the cairn, at the eastern end, is 43 feet, and at the western end, 26 feet, the horns expanding in the same way as in the former case, at either end.

Operations were first commenced in the highest or eastern end of the cairn, and the workmen in a short time laid bare the upper ends of four large monoliths; the divisional stones of an irregularly rectangular chamber, the roof of which had fallen in or been destroyed, filling up the compartments with the superincumbent mass of the cairn. When cleared out to the floor, the chamber was found to correspond in its general plan and style of architecture with those of the neighbouring conical chambered cairns, though differing somewhat in detail.

The entrance passage is almost in the centre of the eastern end of the cairn. Two flat stones, set on end, about two feet and a half high, form a kind of door-jambs at the outside. A well-built passage, two feet wide or thereby, runs inwards for ten feet, and at its further end two stones, similar to those outside,

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are set in the wall of the chamber, forming a doorway eighteen inches wide. Passing through between these, you enter the first compartment of the chamber, measuring from sidewall to sidewall, across the doorway, four feet seven inches, the width expanding until it measures six feet from sidewall to sidewall at the first pair of divisional stones. The distance of the divisional stones from the doorway is three feet seven inches at the minimum, as they are not set square to the sidewalls, which are slightly curved. The divisional stones themselves are large flagstones, untouched by a tool, which are sunk on end into the floor, and let into the wall at either side so as to stand across the chamber, leaving a passage between their edges of two feet two inches wide. They rise to the height of seven, and seven feet and a half, above the floor respectively, and are each about two feet and a half of average breadth, and about three to four inches thick. Passing between these stones into the second compartment, the width of the chamber is rather more than six feet, as the side walls do not run in line exactly with those on the other side of the divisional stones, and these dividing stones themselves are not exactly in line with each other. The second compartment measures about six feet from sidewall to sidewall, and five feet four inches from the opening between the first pair of divisional stones to the opening between the second pair, which leads into the further recess, or third compartment, over which, being lower than the others and more massively built, the roof still remains, formed of an enormous flat stone weighing several tons. The opening into this recess is two feet four inches high, and twenty inches wide. The pair of divisional stones which flank it are each three feet and a half high, two feet and a half wide, and eight to nine inches in thickness. The interior measurements of the third compartment, or recess, are four feet eight inches from sidewall to sidewall, two feet four inches from the entrance to the large stone which forms the back wall, and two feet and a half high. It was quite full of very small stones, and the peculiarly shaped aperture was closed by a slab, which fitted it pretty neatly. In one corner of the second compartment, a slight overlapping of the upper

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stones of the side wall seemed to indicate that, at a height of about six feet above the floor, the walls began to converge.

A handful of animal bones were found among the rubbish, resting on the floor of the chamber; but they may be no older than the dilapidation of the cairn. The floor itself was composed of clay, in which a rough paving of small flat stones appeared to have been partially and irregularly laid. For a depth of four to five inches, the clay was plentifully mixed with ashes, charcoal of wood, and broken and calcined bones. The singular feature of the bones was, that though the clay was literally charged with them, and the fragments that were uncalcined were in good preservation, the largest piece found, after diligent search, did not exceed an inch in length by half an inch in breadth. About a dozen flint chips, and two fragments of pottery, of a better make than that usually found in the refuse heaps of the Picts' houses, were all the manufactured relics found. The search for relics was extremely disappointing; but the structure of a hitherto unknown class of cairns has been ascertained.

The enormous length of the cairn gave reason to suppose that there might be other chambers in it. The west end was tried, but though opened out to the foundation in the centre, no signs of any definite structure were discovered. The centre of the cairn itself was then tried, with a like result, and an excavation between the centre and the chamber was equally fruitless. Throughout the whole length of the cairn, behind the chamber, these excavations seemed to indicate that it was merely a structureless mass of stones, and the ground where the bottom of the cairn was reached had never been disturbed, though a slight trace of charcoal was found beneath the cairn.

There remained to be disclosed the structure of the curious hornlike projections at the ends of the cairn. The one at the south-east corner was selected, as being the best defined. It was entirely covered with turf and heather, and was about four feet high at its junction with the cairn. When excavated along its entire length, it was found to be a structureless mass of stones along the upper part, but regularly built in the

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lower, with an appearance of a double wall, measuring fifty-four feet from the entrance to the tip of the horn, which was in some parts well defined. At the end, the stones used were large flags and smaller courses alternately, and two stones were set on edge near the termination of the wall. The building was removed to the foundation in several places, and the ground beneath tried, but it had never been disturbed. Not only the purpose but the structure of the horn, with its double wall, was a complete puzzle; and though subsequent excavations in other cairns gave a complete elucidation of the structure of these singular appendages, they are still as inexplicable as to their purpose as ever.

The line of direction of the passage, and the entrances to the several compartments of the chamber, does not coincide with the axis of the cairn, the direction of the central line of the cairn lengthwise being, by compass, E. by S., while the central line of the chamber and passage is E.S.E.

The smaller long cairn, a few hundred yards distant, had been considerably reduced in size by the neighbouring farmers, who found it a convenient quarry. The upper part of the chamber, in its eastern end, was partially exposed, but there was no appearance of any deeper excavation having ever been made. When cleared out, it proved to be of somewhat the same pattern as the chamber of the larger cairn, though the passage was shorter, the compartments larger in proportion to the size of the cairn, and the chamber terminated in a semi-circular compartment, instead of the small low recess roofed in by a single stone, as in the other. The side walls, too, though they were dry-built like the other, had in the larger, or second compartment, a slab built into them on either side, the faces of the slabs being flush with, and forming part of the wall, which was built not only on either side, but on the top of them as well. While the faces of the slabs thus formed part of the face of the wall, they gave solidity to the work and saved building. The height of the dividing stones, and consequently the height of the whole chamber, seemed to have been less in this cairn than in the other.

The same general description applies to the chambers in

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both cairns, the arrangement of the compartments being in both cases similar.

The passage, measuring from the outer wall of the horn, was nine feet long by two feet wide, entering the chamber between the edges of two slabs set on end, whose faces formed the end walls of the first compartment, and rose to the height of four feet above the floor. The first compartment was nearly square, measuring five feet and a half from sidewall to sidewall, and four feet ten inches from the end of the entrance passage to the passage between the standing stones, dividing it from the next compartment. The second compartment was seven feet nine inches wide at the inner side of these dividing stones, widening to eight feet in the centre, and contracting again to seven feet at the next pair of dividing stones. The central pair of dividing stones were five feet and a half high, and the other pair, towards the back of the chamber, four feet. The semicircular compartment at the back was six feet eight inches across, behind the dividing stones, and five feet from the entrance between them to the back.

In the first compartment, what seemed a secondary interment was found. In the space between the entrance jamb on the south side and the first dividing slab, a short cist was set *on* the floor, one side of which projected beyond the line of the passage. It was formed (as shown in the diagram) by one stone, about three feet and a half long and nine inches deep, being laid on edge so as to stretch between the front end of the chamber and the first divisional stone, and cutting off from the area of the floor of the compartment a space about four and a half feet long by twenty inches wide. This stone, which thus formed one side of the cist, while the structure of the chamber formed the other three, was scarcely long enough to reach the divisional stone at the one end, and an end stone was inserted to fill up the hole, thus reducing the interior length of the cist to four feet. Another stone was laid on its edge along the wall, which formed the other side of the cist, and gave support to the two covering slabs. The interior of the cist was filled with partially blackened clay, in which there was a whitish stratum as of bone-

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ash. At the east end of the cist lay an urn imbedded in the clay, and turned partially on its side. It was in a very poor state of preservation, and could only be lifted by lifting clay and urn together. It shows a very distinct and elegant ornamentation, running round it in parallel bands, as if a string of two strands, slightly twisted, had been passed round it and impressed in the soft clay. Some of the fragments—for it fell to fragments when dry—show the impress of fibres in the ornamentation when examined with a magnifying glass. The clay is coarse and stony; but the finish of the lip and the general style of the urn, betoken taste in the manufacturer. The clay, too, has been plentifully sprinkled with small scales of mica,—most probably to add a glittering beauty to the sombre receptacle of the ashes of the dead. There is no such micaceous clay obtainable in the district.

On closely examining the blackened clay of the interior of the cist, one or two small round, black bodies, like cross sections of the shank of a tobacco-pipe, were detected by Mr. Shearer; and the whole of the clay being then carefully removed and washed, seventy of them were collected. They seemed to be scattered about in the cist, except in one place beneath the urn, where they lay (as in the section of clay sent) in a continuous line, end to end, as if when placed there they had been threaded on a string. They are indubitably beads of simple manufacture, and seem to be composed of the lignite which belongs to the oolite beds of Sutherlandshire, travelled pieces of which are not unfrequently found in the Caithness boulder clay. The beads are all about the same diameter, and are cross sections of a cylinder, many of them bored from opposite sides.

In the floor of the second compartment of the chamber were found a small quantity of broken animal bones, among which was a portion of a human upper jaw and some phalanges of fingers or toes. In one corner, imbedded in the wet clay on the floor, were two or three human teeth, so much decayed that they would not lift.

In the third compartment were found the frontal portion of a human skull, with a few more fragments in a very friable

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condition. These, however, with care, were got dried and preserved. A quantity of bones, animal and human, lay partly imbedded in the soft clay of the floor, as if they had been left on, and not buried in it.

The whole floor of the chamber was carefully trenched up from the undisturbed bottom clay, and examined thoroughly piece by piece, as in all the other cairns explored. It contained a large percentage of charcoal and bone-ash, with fragments of bones, but not a single flint-chip, and not a vestige of pottery, or any manufactured object. The minute examination of the floor, however, revealed the fact that the beads were entirely confined to the interior of the cist.

The excavation of the horns of this cairn showed them to be of essentially the same plan and structure as those of the other. Measured along the curve, as they branch out from each side of the entrance, they extend thirty feet forward, and are about ten to twelve feet across at the tips, which, however, are so broken down as to render exact measurement somewhat difficult. They have the same double wall, which is so well seen in the Ormiegill cairn, to be next described, and the inner wall still stands five feet high where it joins the entrance. Thirty-three feet back from the chamber were the remains of a circular wall, also well seen in the Ormiegill cairn.

Our acknowledgments are due to F. S. Bentley Innes, Esq., of Thrumster, for the ready permission granted for the excavation of these interesting cairns.

CHAMBERED SHORT CAIRNS WITH HORNS.

By permission of J. G. T. Sinclair, Esq., of Ulbster, we next excavated a cairn at Ormiegill, near Ulbster, which proved the most singular and interesting we have yet met with, both in structure and contents. So far as I can ascertain, it is perfectly unique in structure, nothing like it being known, I believe, in Britain. From a recent examination of some unexplored cairns at Brochwhin, on the estate of Clyth, however, we have reason to believe that one of them at least will turn out to be a cairn of similar structure.

The Ormiegill, or Ulbster cairn, when first commenced,

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gave no indication of its being other than a simple chambered round cairn, like those explored at Thrumster by Mr. Rhind, and whose structural appearance is shown by the ground-plans of the four cairns figured. But after clearing out the chamber and passage, we tried for horns, and to our great surprise and delight, the external outline of the cairn proved to be perfectly entire all round; and after clearing three sides to the foundation, the outer walls were revealed without a break, except at the corner of one of the horns where the road had come close to the cairn. These outer walls still stand, entire as the day they were built, to the height of about a couple of feet above the foundation. They are built of flattish stones, and slightly inclined inwards.

It presents a curious combination of the characters of the round and the long cairns with horns; and the singular double wall, which puzzled us so much in the horns of the long cairns, here runs all round the outer circumference of the structure. Both walls are faced to the outside only, the inside of the wall presenting no regular face, and the space between being roughly filled in with rubble. The circular wall surrounding the chamber is not exactly circular, but slightly compressed at the sides. It is built of squarer, heavier blocks, and faced also only on the outer side, the inner side being irregularly finished, and the space between it and the walls of the chamber (which of course are faced to the inside) being filled up with rubble. This circular wall, also, slants slightly inwards, as if to take a beehive shape; but as we have only from two to three feet of its lower part left, its dome-like character must be matter of conjecture.

The arrangement of the passage and chamber is the same as in the other cairns. The entrance looks by compass S.S.E. The passage is ten feet long and two feet wide, the stones that stand on end on either side as you enter the first compartment of the chamber, and form its end walls, being three feet four inches in height. The first compartment is rather smaller than usual, being only two feet eight inches in its narrowest, and three feet in its widest measurement, from the entrance to the first pair of divisional stones, and four feet

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ten inches from sidewall to sidewall. The second, or central compartment, is larger in proportion. It measures eight feet ten inches from sidewall to sidewall, immediately behind the first pair of divisional stones, and seven feet five inches in front of the pair which separate it from the next compartment; while along the side wall, on one side, the measurement is six feet, and along the other six feet nine inches. The last compartment is also small. Though its cross measurement is five feet two inches behind the divisional stones, it is only two feet three inches on the floor, from the base of these to the base of the large stone which stands inclining outwards to form the back wall of the chamber.

Standing in the centre of the cairn, with your back towards the entrance, the horn on the right and at the back part of the cairn points, by compass, due north, the horn on the left pointing N.N.W. The two horns flanking the entrance point E.S.E. and S.S.W. respectively. No two of them are exactly of equal length; but measuring from the circumference of the circular wall surrounding the chamber, the left hand horn at the back is thirty feet long. The tips are slightly convex; and while the breadth of the front horns, from corner to corner, is eight feet, the breadth of those at the back, similarly measured, is nine feet. The line between the inner corners of the tips of the front horns is fifty feet and a half, and between those at the back, similarly measured, it is thirty-seven feet. Between the corners of the horns lengthwise, from the tip of the front horn on the outer side, to the tip of the back horn on the same side, the measurement is, on the one side, sixty-six feet, and on the other, sixty-four feet, but as the corner has been taken partially away on one side, the measurements may have been exactly similar. The circumference of the circular wall around the chamber is eighty feet.

The floor of the chamber was laid with a pavement of rough slabs of small size. On this pavement, and under it, were many bones, burnt and unburnt, in a greasy clay, plentifully mixed with ashes, charcoal, and broken pottery. The uncalcined bones were mostly so wet that they would scarcely lift. The calcined bones, though very fragmentary, retained their

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cohesiveness better. Some human phalanges, quite calcined, were turned up along with unburnt bones of animals, among which were teeth of human adults and of the horse, ox, and dog. The broken upper jaws of (I think) two children, with fragments of skulls, occurred in the central compartment. A list of the animals and human remains, however, may be made out from the collection sent. In one part of the floor (which was not so completely paved as to enable us to separate between the remains found above, and those found below the paving) there was a large quantity of very small bones, a considerable layer, about an inch thick, which must have contained many thousands. They were extremely friable; and unfortunately no specimen of them was got preserved. We conjectured them to be frogs' bones, as they were too small for birds, and had they belonged to mice, we should have found their teeth.

Besides the fragments of pottery of three or four different kinds, but mostly mixed with mica, that were found in this cairn, the manufactured objects were a finely finished hammer of grey granite, polished and perforated for the handle; two well-made flint arrowheads; the point end of a finely finished flint knife, ground along its cutting edge; and a disk of flint, about an inch in diameter, of the type known as "thumb-flints". The hammer, disc, knife, and one arrowhead were found in the central compartment, imbedded in the clay of the floor, but not together; and the other arrowhead was found in the first compartment.

As usual, some of the bones in this cairn were found lying on the floor among the rubbish of the cairn; but the greater portion were imbedded in the layer of clay, ashes, and charcoal that covered the entire area of the chamber, to the depth of half a foot or more, over the undisturbed ground below. In some parts the ash-bed went down further than in others, as if there had been pits in the floor, and the pavement was most entire around the sides of the chamber; while in the centre the occurrence of bones, etc., beneath the slabs was more frequent. A few traces of human bones and some human teeth were found outside and close to the outer wall,

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at a point nearly halfway between the tip of the horn on the right hand side of the entrance and the doorway of the cairn.

Close to this cairn, on the margin of an old loch now drained, there is a very large accumulation of stones, like a crescent-shaped cairn. We tried one end of it, where it seemed to terminate in a circular cairn, and found, on removing the covering of about eighteen inches of peat, that the stones were disposed at the end in a regular line, forming a kind of entrance way, but we could find no structure or chamber; and as the semicircular ridge is nearly one hundred yards long, we gave up the idea of attempting any further excavation, as not warranted with the funds at our disposal.

A large number of circular heaps of stones are scattered around. Four or five of these were turned over; and though they presented no feature of external difference from the common small cairns with central cists, subsequently to be noticed, we found no evidence of their being sepulchral, either in the cairns themselves or in the soil underneath.

Another large cairn, with two monolithic slabs standing in the centre, was also commenced; but finding that it had been, at some time previously, turned up to the bottom, its further exploration was abandoned as useless.

Near the Ormiegill cairn, there is a large block of stone, which has been very rudely cut across to a depth of nearly three inches, and along the side there is a row of wedge-holes of peculiar make. The cutting is evidently of old date; but there is nothing to connect it with the chambered cairns, in which no mark of a tool has yet been discovered. Near by, however, in the grave-ground of Ulbster, there is one of those ancient sculptured stones on which is the figure of a cross, and a number of uncouth-looking beasts.

LARGE ROUND CAIRN AT CAMSTER.

The group of cairns at Camster, lying more in the centre of the county, are in better preservation than any of those along the coast. It is but recently that a road has been made through the district in which they are situated, and they have been but little visited. We explored the round one, of which

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the photograph is appended. The long one yet remains to be explored.

This magnificent round cairn is two hundred and twenty feet in circumference at the base, and about fifteen or eighteen feet in perpendicular height at the centre. It is the only cairn I have seen, on whose chamber any portion of the roof remains. Its structure is readily seen from the ground-plan and section as figured. The section is taken along the south side of the passage. In structural characteristics, it is radically of the same type as the circular cairns at Yarhouse, explored by Mr. Rhind, though it far exceeds the largest of them in size.

We first obtained access to the interior by the hole in the roof, where one of the covering stones had been removed, or fallen in from the superincumbent pressure. The chamber was quite filled with the mass of stones that had fallen in from the top. When we got down to the horizontal passage, however, it was found to be choked full of stones to the very roof, completely packed from end to end. As the passage is upwards of twenty feet in length, and roofed with immense flags, fitting close together, and the sides were quite entire, the whole of this packing must have been introduced purposely. We found it no easy matter to get it cleared out, as at the outer extremity the passage is only about two feet and a half high by two feet wide; and after a man had wormed his way inwards for five or six feet by clearing out the stones, there was not room for him to pass the larger ones outwards. The passage widens and heightens a little as it goes inwards, until at the entrance to the first compartment of the chamber it is about three feet and a half high, and two feet and a half wide. It is buttressed at intervals on both sides, throughout its length, by stones standing edgeways, which help to support the massive roofing slabs, as well as to strengthen the walls. The direction of the passage and entrance to the chamber is E.S.E.

Entering by the passage, the first compartment of the chamber forms a kind of antechamber to the beehive-shaped vault, in which the other two compartments are merged, as

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the divisional stones which separate the second, or main compartment, from the third, do not rise to the roof, as they seem to have done in the long cairns. Though the ground-plan of the two last compartments is more rectangular than oval, the contour of the walls is gradually brought to an oval form after they have risen a few feet above the floor. At the height of seven feet they begin to converge, and the area left at the top was then covered in, at the height of ten feet, by two very large slabs, only one of which now remains.

The first compartment, then, is flat-roofed, the roof being also formed of two large slabs, to support which transverse lintels are laid across the doorways. The entrance doorway next the passage is only seventeen inches wide, and is exactly in the middle of the front wall, which is formed of two stones each seventeen inches broad, standing on either side of the doorway. The side walls, which are compactly built, measure, the one three feet seven inches, and the other, three feet ten inches, in length, and three feet and a half high.

The entrance from the first compartment, or antechamber, into the vaulted space beyond is but fifteen inches wide, and three feet high. The divisional stones which flank it, and are built into the walls of the oval cell or vault, are seven feet high, and set at a considerable angle to the side walls, in order to fall in with the oval form of the cell; and for the same purpose, instead of being of the same breadth from top to bottom, they taper irregularly to the top. The distance from them to the next divisional stones is, on the one side, four feet ten inches, and on the other, four feet five inches.

The third compartment, which, owing to the stones which divide it off from the second not rising to the roof, forms a portion of the vaulted cell, is but three feet by four feet two inches, the opening between the divisional stones being three feet wide. The stones themselves, which are respectively nine inches and fifteen inches thick, rise four feet above the floor.

The floor of the chamber presented the same appearances as that of the other cairns explored, with this difference, that there was no pavement, and the clay was blacker and more earthy. There was a larger heap of ashes in the opening between the

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two last divisional stones, and in the centre of the main compartment, than anywhere else.

As usual, a number of bones, human and animal (though there were but very few animal bones in this cairn), were got on the floor, and among the rubbish immediately above the floor. On the floor, also, but not imbedded in it, was found the portion of an iron knife, with a very thick back, sent along with the other relics. It is very old, as its complete oxidation indicates, but probably not of the age of the cairn itself. A few feet distant, but deeply imbedded in the floor, were found the small but beautifully fashioned flint knife; and, strange to say, a nodule of iron ore, as large as a man's fist. The occurrence of these three—a flint knife, an iron knife, and the nodule of iron ore—in such a cairn, and in such apparently close connexion, is so suggestive of probabilities, that it is difficult to guess even at an explanation. Had the knives of flint and iron alone been found, it would have been easy to account for the iron one, by making it the *skian dhu* of some robber or rebel of the troublous times of former days, who made this cairn a hiding place. But the presence of the ore along with the manufactured article, complicates the matter beyond reasonable explanation in that way.

The broken fragments of four or five urns, or vessels of clay, some of them of decidedly well made pottery, were found, also, imbedded in the floor. These fragments are larger than any found in the floors of the other cairns. One of these vessels of well-burnt clay, blackened on both sides, must have been twelve inches across the mouth. The pieces marked Nos. 1 and 2 join together, and form a large segment of the rim. They were found three or four inches under the surface of the floor, close together, but while the lip of the one was uppermost, in the other case it was down. The clay of these is also plentifully mixed with mica. On No. 8, the ashes still adhere to the inner side, while the outer side is clean and unblackened. Fragments, Nos. 3, 4, 5, and 6, belong to the same vessel, and partly piece together. It has been of very handsome make, and is the thinnest pottery I have seen from the cairns. Holes, about the diameter of an ordinary goose-

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quill, have been bored in it at intervals, immediately under the lip. No. 7 (of the fragments) exhibits an ornamentation unique as regards the pottery of these cairns. The outside is roughened all over by the impression of the point and nail of a small finger, obliquely thrust into the clay.

Most of the bones found were on the floor; and the clay was not quite so completely mixed with fragments of bone as in the other cairns. Scarcely any of the bones in this case are calcined; and looking at all the circumstances, it seems as if the unburned bodies were deposited subsequently to the urns. In the chamber were found fragments of (I think) three, if not four, human skulls, and a number of other fragments of the human skeleton. But the most singular thing in connexion with the human remains of this cairn, was that about halfway along the passage, or about four yards outwards from the chamber, and about the same distance from the outside entrance, two human skulls, and bones of the upper extremities, were found among the stones with which the passage was packed choke full from end to end, both skulls being at least six inches above the floor. As no part of the lower extremities was found, it seems as if the bodies had been set on the floor of wet earth, the bones next the ground perishing first.

SMALL CAIRNS ENCLOSING CISTS.

Besides the chambered cairns, there are scattered over the county a large number of smaller cairns, generally about twenty feet, sometimes as much as thirty feet, in diameter, and seldom rising more than six or seven feet—often not more than three or four—above the surrounding level. Most of these have been opened from mere curiosity, or in search of treasure, and their contents lost to science.

These small cairns, enclosing cists, appear to be of three classes. They are often in close proximity to chambered cairns; and though in most instances they have been greatly destroyed in the opening, their structural characteristics may generally be distinctly enough made out. There is, first, a class in which the cist is elevated two feet, or thereby, above

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the surface of the ground. These cists, though short, are wide in proportion to their length, and have well-paved bottoms, the cairn between the bottom of the cist and the surface of the ground being formed of flattish stones, pretty regularly built. These elevated cists, with paved bottoms, all contained skeletons; but we have not been able to find an undisturbed cairn of this kind, though we have examined six, all agreeing in character with the foregoing general description. In no case could we get an exact measurement of the cist, from the way in which it had been opened, and the general dilapidation of the cairns. In two instances, however, it was found that the cairns had an outer wall describing a circle of about eighteen feet in diameter, the cist being in the centre. It thus appears that both the larger and the smaller cairns were not mere heaps of stones originally, but that they had both an external and internal structure, elaborated with some care on a definite plan.

One of these small cairns at Camster, not far from the large ones already described, had been opened not very long ago, and the bones huddled together, by the incautious openers, under one of the covering stones of the cist. The skeleton must have been in excellent preservation, as after the rough usage it had received, one femur, part of the pelvis, and ribs were still entire. The skull had unfortunately been crushed. One tooth remained in the jaw,—a molar, worn from the outer edge inwards in a very peculiar way.

The second class of these cairns has the inclosed cist set on the level of the ground, and bottomless. We opened a very remarkable one of this kind at Brochwhin, on the estate of Clyth, by permission of Adam Sharp, Esq., of Clyth. Here there are two eminences, one of which, with a green cairn on the top of it, is called Brochwhin; and the other, which has on the top a space two hundred paces long by sixty-five broad, enclosed by a wall of great thickness, with a gateway at either end formed by immense slabs set on edge as for gateposts (though they are unmarked by a tool), is called Garrywhin. Garrywhin seems to be a corruption of the Gaelic, *Garbh Fionn* the stronghold of Fingal; and *Broch whin*, in the same way,

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would be Fingal's Broch, or castle. In the valley between these two places, and close beneath the walled inclosure, lies the small cairn alluded to. It is on the top of a small eminence; and from the cairn, as from a centre, a number of lines of small standing stones diverge to a distance of fifty yards down the face of the hill. On the other side of the valley from this eminence, there is another group of parallel lines of standing stones, which lead away to another cairn, eighteen feet in diameter, with a cist of four slabs, lying N.W. and S.E., and measuring internally five feet long, two feet and a half broad, and one foot nine inches deep (opened long ago); and thence the lines of stones range away across the ridge of hills, where they can be followed for a distance of nearly half a mile. These stones seldom rise three feet above the ground. They are set on edge, often with two smaller stones, one on either side, to wedge them into the hole that had been dug to receive them. A group of them, arranged in irregularly parallel rows, also occurs at Thrumster, but unconnected with any trace of a cairn; and another group at Camster, near the small cairn before referred to. At Bruan, there is a group of between 400 and 500 of them, arranged in upwards of twenty irregularly parallel winding lines. These have not been ascertained to be in connexion with any cairn. They are generally two or three yards apart.

The cairn, from which these diverging lines of standing stones proceeded, was thirty-five feet in diameter and five feet high. Digging in the centre, a very large flat slab was reached, which required the united strength of four men to turn over. This was the cover of the cist, which lay, by compass, east and west. The cist was formed of four stones, its internal measurements being three feet five inches long, two feet four inches broad, and one foot nine inches deep. There was a false side inserted, with about four inches of rubble to fill up the space between the true and the false side, which narrowed the breadth to one foot ten inches. At the east end, the fragments of an urn, with the twisted string ornamentation, lay on the clay bottom of the cist, and among them the crowns of two human molars. After removing the fragments of the

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urn, the clay bottom was turned out and searched, and two oval-shaped pieces of chipped flint were found.

The third class of small cairns, with cists enclosed, occurs generally on the banks of streams or lochs. They are composed of very small stones, mostly not much larger than road metal, and they always present an appearance as if long subjected to the action of fire. We have not yet met with one of these undisturbed; but the fact of their being cisted cairns is established by general testimony.

GROUPS OF CISTS WITHOUT CAIRNS.

On the hillside at Garrywhin, close beside the rows of standing stones and cairns before mentioned, there is a group of short cists, about three feet and a half in length, and nearly square, which are simply set in the ground, and have no cairn reared over them, or other external mark to indicate their position. We looked into several of them, the sides or ends of which showed through the surface; but they had evidently been disturbed before, and we have since had no opportunity to prosecute their investigation further.

Having been informed that at a place called Achavar, near Lybster, a group of graves had been discovered some twenty years ago by some trenching operations, Mr. Shearer went up and examined the locality. A large green cairn occupies the crest of a ridge, and about fifty yards distant from it, along the base of a natural wall of rock, the graves were found. Mr. Shearer had three of them opened. The first lay parallel to the rocky wall, the second at right angles to it, and the third had been so much destroyed that it could not be distinguished which were the sides and which the ends. They were all short cists set in the ground, and formed of slabs; but the bottoms appear to have been paved with seabeach, although they are at a considerable distance inland. The length of the cist in the two cases mentioned was about three feet and a half. The bones were found lying on the beach-gravel in the bottom of the cist, and scarcely more than two feet under the present surface. When the graves were first discovered, the skulls are reported to have been in excellent preservation;

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but now, in the three cases re-exhumed, the bones are very much decayed. There is every probability that there are still a large number of untouched cists, both here and at the locality previously noticed.

Dr. Mill, of Thurso, has preserved a beautiful urn, ornamented with lines of dots, forming a curiously intricate pattern. It was found in a cist, the cover of which was raised by the plough, on his farm of Glengolly. Two very large urns (now in the Museum of the Society of Antiquaries at Edinburgh) were similarly turned up on the farm of Aukhorn, near the Birkle Hills, described by Mr. Laing. The beautiful fluted vase, figured by Mr. Rhind, now in the possession of Mr. David Coghill, Wick, came out of a cairn at Thrumster, which was quarried many years ago for building purposes.

DEFENSIVE STRUCTURES.

The walled hill-top of Garrywhin, already described, is the only defensive structure of its kind in the eastern side of the county. The local tradition connected with it is one which is also told of several similar places in the centre and south of Scotland. It is to the effect that here the last survivor of the conquered Picts, a man of superhuman strength, was put to death. Such was the strength of his gripe, that the shank-bone of a horse, which, for some reason or other, was put into his hand, was crushed into splinters. The manner of his death, according to the story, was on this wise. He and his two sons were the only survivors of the race after a fierce battle. They were taken prisoners, and promised their lives and liberty if they would divulge the Pictish secret of making *ale* from heather. The old man agreed to divulge the secret, but only on condition that his two sons should first be slain. Having witnessed calmly the deaths of the sole sharers of the coveted knowledge, the old man then told his enemies they might despatch him too, for the secret should die with him,—as it did.

In the loch of Yarhouse there are two small islands, which seem to have been occupied by buildings, most probably of a defensive kind, but so much dilapidated that there is little

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chance of their character being made out by excavation. At the end of the loch next the cairns, however, there is a very large green cairn, round the land side of which a deep fosse has been dug communicating with the loch. This cairn would doubtless be worth investigation, but from its great size its excavation would be expensive,—as the exploration of all the green cairns is, both from their size and peculiar construction, much more expensive than that of the chambered cairns or sepulchral tumuli.

In the loch of Rangag, on the estate of Forse, there is a very well preserved ruin of a broch, with a fosse on the land side, and three concentric outer walls. Some of the chambers in the wall of the broch itself are visible; but it has now become simply a heap of stones externally, although if cleared out, about twenty feet of the height of the structure might yet be found entire. It would be also a costly work; but George Sutherland, Esq., the proprietor, has kindly given permission to excavate any of the numerous remains on his estate, and there are many most interesting places round the shores of this and the neighbouring loch of Stemster.

STANDING STONES, ETC.

By this loch of Stemster stands the most remarkable group of standing stones in the county. It is somewhat of a horse-shoe form, or perhaps more like the letter U. The stones are from three to five feet high, and are mostly thick slabs of three or four feet in breadth, arranged with their flat sides facing each other, and the edges directed towards the space enclosed. There are thirty-three of them still standing; and though there are now many gaps in the line, they seem to have been regularly placed at intervals of three paces round the enclosure, which measures seventy paces long by thirty-three in greatest width, contracting a little towards the open ends, which look due south by compass. Close by are the remains of a conical cairn with an elevated cist, and several other cairns yet unopened, with circular rings of stones in the ground here and there, sometimes singly, sometimes in pairs, and touching each other. These are not circles of standing

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stones, but simply rings of stones set on edge, the upper edges peeping out of the turf.

The rows of small standing stones, radiating from a central cist or running in irregularly parallel lines, have already been described. Standing stones of a much larger size, seven to ten feet high, occur frequently, sometimes singly, often in pairs three or four yards apart. They are sometimes not far from cairns, but have no apparent connexion with them. Many of them are popularly associated with Norse traditions. None of these are, so far as I know, tool-marked; although there is a sculptured stone in the burying-ground at Ulbster, before alluded to, and one, which seems to have been sculptured, in the burying ground at Clyth.

CONCLUDING REMARKS.

The little that has been done as yet, towards a systematic exploration of the ancient structures described in this Report, warrants no definite conclusion as to their probable antiquity, or even their relations to each other in time. But the hitherto unknown long cairns have now been, for the first time, ascertained to be chambered structures, of the same internal type as those previously known of a round or oval form externally, though differing so widely from them in their outward configuration, and specially differing from all known cairns in the peculiar structure of the crescentic horns, by which they are terminated at either end. In the Ormiegill case, a new and altogether unique type of cairn structure has been discovered, and owing to the exceptionally excellent preservation of the building, most satisfactorily made out in every particular. The circular cairns have been ascertained, in a number of instances, to have possessed a finished outward face of building, so that whether chambered internally, or simply heaped over a central cist, they were not always irregular heaps of stones outwardly, but circular buildings, for at least some portion of their height. The connexion of the diverging lines of small standing stones, with a central cisted cairn, is also, I believe, a new fact in northern archæology; and the investigations here detailed point further to a probable distinction of the un-

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chambered cairns into two classes, hypothetically characteristic of different modes of sepulture,—the cairn with elevated cist, containing the skeleton in a contracted position; and the cairn with a bottomless cist set on the natural level, or slightly sunk in the ground, and containing an urn, implying cremation. It would be interesting and important to ascertain whether this probable classification may be verified by further research, and whether those remarkable groups of cists, without cairns, may not yield valuable materials for anthropological deductions.

The manufactured relics obtained from these chambered cairns would refer them to what has been not unhappily termed "the grindstone period," sufficiently indicated by the polished stone hammer and the ground-edged knives of flint. The fact, however, of the occurrence of the flint knife, along with the knife of iron and nodule of iron ore in the Camster cairn, is both puzzling and suggestive; and the common occurrence of unburnt skeletons, along with abounding evidences of cremation in the same cairns, is also suggestive of their having been used for different modes of sepulture, if not by different races, at different periods.

Whatever antiquity may be assigned to these interesting structures, the people that reared them were no despicable barbarians. They have exhibited not only constructive ingenuity and skill of no mean order, but the mechanical difficulties to be overcome in the transportation, and erection in their structural position in the cairns, of such large blocks of stone, —and even the gathering and heaping up of such enormous masses of stones, some of the larger cairns containing more than 20,000 cubic feet of materials,—imply, if not a power of intellect, at least a power of numbers, such as no society of mere savages broken up into little tribes, and incapable of united action and sustained and laborious effort for a concerted purpose, and a purpose, too, which was plainly unproductive of any material benefit, could ever have attained.

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XVII. — *Description of a Living Microcephale.* By John Shortt, M.D., F.L.S., M.R.C.P.L., F.A.S.L., etc., General Superintendent of Vaccination (late Zillah Surgeon, Chingleput), Local Secretary of the Anthropological Society of London for Madras.

I have much pleasure in submitting to the Anthropological Society of London the following description of the individual, with three photographs and measurements, the latter taken according to *Scherzer* and *Schvarz*, as correctly as the instruments at command, namely, a common pair of compasses and a measuring tape, would admit of.

This individual is the offspring of Maharatta parents, who are calico-dyers by profession, and is the eldest son of several children, all of whom are now dead, except the subject under description, and a younger brother, about two years old, but naturally formed. This lad's parents state that their second child, a girl, was also a microcephale, and died when five years old. Both parents are now alive, and are not aware of there having been any microcephaly or imbecility of any kind in the family.

The individual I now describe is said to be sixteen years of age, stands four feet one inch in height, and weighs fifty-four pounds (avoirdupois); is of a tolerably well-formed figure and proportion, except the head, which is *extremely* small and rounded, with the bones apparently well consolidated, and the scalp covered with black hair. The scalp itself is unusually thick and somewhat loose. The face is small, of a wedge shape, with slightly prominent malars, pointed chin, and ape-like expression of countenance; the os frontis recedes backwards from the superciliary ridges, the latter forming a rather prominent ledge, and there being a palpable terrace-like form or depression in level with the eyebrows. The brows are thin, covered naturally with hair, and slightly arched. The eyes are rather small, pupils large and active, irides brown,

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the upper palpebræ full, and the eyelashes natural. The nose aquiline, long, straight, and widened at the alæ. The mouth large, lips of moderate size, teeth twenty-eight in number, and large, with the lower central incisors diverging obliquely on either side, leaving a triangular gap between them. When the teeth are closed, this gap measures about one inch in width, and through which the tongue may be extended to the same extent; tongue large; the mouth is frequently kept open with the saliva dribbling over the chest now and again. Ears are large, and stand out unnaturally prominent; the concha and external opening of the ear, etc., naturally formed. Upper extremities well formed, except that the elbow-joints cannot be straightened out fully. Trunk well formed and nourished. Penis much longer and larger than natural for his age; root of penis covered with down; testicles small, and in the scrotum. As regards the lower extremities, the internal condyles of the femur project somewhat internally; the feet are flat, and the metatarsus turned outwards at its junction with the tarsus. As regards the mental condition of this individual, it might be termed infantine, he cannot utter a single word; the only sound that issues from him is *nah*. He is by no means inquisitive, nor does anything in particular attract his attention. He laughs heartily and claps his hands together; yawns occasionally; sits moping about, and strolls about the place without recognising one from another. He is quite deaf; but on beckoning to him he will come sometimes; eats well; is able to feed himself, but does so without any method. If food be shown to him, he holds out his hands, and on a piece of bread being given him, he receives it in a slovenly manner, breaks it with his hands, and places a portion into his mouth, but this is done without precision; if the food given is not to his liking, he throws it down. He does not seem to recognise his friends, nor does he appear to know one man from another. From the absence of the two last permanent molars, I should say he was only thirteen years old, but his general appearance and hair about the penis would seem to indicate he was sixteen: and I cannot tell whether, from the fact of his being a *microcephale*, if those teeth could be retarded in any way.

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The photographs are by a native. I had some difficulty in having them taken, as it was impossible to keep him quiet even for a few seconds, so that he had to be held down for the purpose, as will be seen in the photographs. His gait is slightly tottering from side to side, much resembling that of an ape. He is said to be filthy in his habits; does not care about clothes; the only covering given is a *langootee*, which he throws away, and goes about nude.

I will offer no remarks on this case, beyond that of submitting it to the society. On a future occasion, when I have had opportunities of observing more of his habits, as well as those of another individual I some time ago met with in the streets, and whose whereabouts I have not yet been able to trace, I hope to be in a position to do so.

Madras, March 10, 1865.

MEASUREMENTS OF THE MICROCEPHALE.

1.	Age of the individual measured	16
2.	Colour of hair	black
3.	Colour of eyes	brown
4.	Number of pulsations in the minute	100
5.	Weight	lbs. 54
6.	Pressing power (force manuelle) measured with the dynamometer of Regnier	0
7.	Lifting power (force renale) ditto ditto	0
8.	Total height	feet 4 1'

MEASUREMENTS WITH THE COMPASS.

		Inches.
9.	Distance of the commencement of growth of hair on the forehead from the perpendicular	3
10.	„ of the root of the nose from the perpendicular	4½
11.	„ of the anterior nasal spine from the perpendicular	5⅞
12.	„ of the point of the chin (mental process) from the perpendicular	8¾
13.	„ from the root of the nose to its lip	2⅜
14.	„ from the tip of the nose to the anterior nasal spine	0½
15.	„ from the point of the chin to the commencement of growth of hair	5½
16.	„ from the point of the chin to the root of the nose	4½
17.	„ from the point of the chin to the anterior nasal spine	2⅜
18.	„ from the point of the chin to the vertex	9½
19.	„ from the point of the chin to the crown of the head	10
20.	„ from the point of the chin to the external occipital protuberance	8

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		Inches.
21.	Distance from the point of the chin to the external auditory opening	4½
22.	„ from the point of the chin to the angle of the lower jaw	3
23.	From the root of the nose to the vertex	5
24.	Distance from the root of the nose to the crown of the head	6
25.	„ from the root of the nose to the external occipital protuberance	6
26.	„ from the nasal root to the external auditory opening	4
27.	„ from the nasal root to the angle of the lower jaw	5
28.	„ from the place where the hair begins to grow to the incisura jugularis sterni	0
29.	„ from the external occipital protuberance to the seventh cervical vertebra	5
30.	„ from one external auditory opening to the other	7½
31.	„ of the uppermost points of fixation of the ear	6½
32.	Greatest distance between the zygomata, or zygomatic arches	6
33.	Distance between the external corners of the eyes	4¼
34.	„ between the internal corners of the eyes	1⅝
35.	„ between the points of attachment of the lobes of the ear	9
36.	Breadth of the nose	1½
37.	„ of the mouth	2
38.	Distance between the angles of the lower jawbone	5
39.	„ from the seventh vertebra of the neck to the semilunar notch of the sternum (incisura jugularis sterni)	4¾
40.	Transverse diameter from one middle line of the axilla above the mamma to the other	10
41.	Distance from the sternum to the vertebral column	13
42.	„ from one exterior superior spine of the ilium to the other	11
43.	„ from one trochanter major to the other	11¾
44.	Circumference of the head around the external occipital protuberance	13¾
45.	„ of the neck	9
46.	From the great tubercle of one humerus, in a horizontal line across the chest, to the other	11
47.	Distance from one middle line of the axilla, above the mamma, to the other	12
48.	Circumference of the thorax at the same place	26½
49.	Distance from one nipple to the other	6
50.	Circumference of the waist	25
51.	Distance from one anterior superior spine of the ileum to the other	12
52.	„ from the trochanter major to the anterior superior spine of the ilium (on the same side)	5
53.	„ from the most prominent point of the sternal articulation of the clavicle to the anterior spine of the ileum	13¼
54.	„ from the most prominent point of same articulation to the umbilicus	11½
55.	„ from the umbilicus to the upper ridge of the symphisis pubis	4

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		Inches.
56.	Distance from the fifth lumbar vertebra, along the crest of the ilium and the inguinal fossæ to the symphysis pubis	10
57.	„ from the seventh vertebra to the terminal point of the os coccygis	16
58.	„ from one summum humeri, across the back, to the other	13
59.	„ from the summum humeri to the external condyle of the humerus	1¼
60.	„ from the external condyle of the humerus to the styloid process of the radius across the extensor side	16
61.	„ from the styloid process of the radius, across the back of the hand, to the articulation of the metacarpal bone of the middle finger	3¼
62.	„ from the same articulation to the top of middle finger	5¾
63.	Breadth of the hand	2½
64.	Greatest circumference of the upper arm (round the biceps)	6½
65.	„ „ of the forearm	6½
66.	Smallest circumference of the same	5
67.	Distance from trochanter major to the external condyle of the femur	17
68.	„ from the external condyle of the femur to the external malleolus	25
69.	„ from the inferior margin of the symphysis pubis to external condyle of femur	6
70.	„ from the internal condyle of the femur to the internal malleolus	23½
71.	Greatest circumference of the thigh	14½
72.	Smallest circumference of the thigh	11½
73.	Circumference of the knee joint	10½
74.	Greatest circumference of the calf	9
75.	Smallest circumference of the lower part of the thigh above the malleoli	10
76.	Length of foot	7¾
77.	Circumference of the foot around the instep	7
78.	Circumference of the metatarsal joints	7¾

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XVIII.—*Notes on an Hermaphrodite.* By Captain Richard F. Burton, V.P.A.S.L., F.R.G.S., H.M. Consul, Santos.

Sir,—Having been asked to commit to paper any anthropological curiosities which met my sight whilst travelling about the Far West, I send you a few observations made by me at St. Vincent, Cape Verd Islands.

At Novo Mindello, capital town of St. Vincent (Azores), I was allowed to inspect one of those malformations which go by the name of hermaphrodites. It is considered a boy, and is the son of Serafinis Federigo di Ramos, a guard in the custom-house, and his wife Catharina, who are first cousins. The only other issue is a girl, a specimen of modified albinism, the skin being white and freckled and the hair colourless, whilst the eye shows no trace of pink.

Antonio de Ramos, as the malformation is called, will be eight years of age in September 1865. He has at present twenty-four teeth. His height is four feet four inches, his girth under the armpits two feet four inches, and round the haunches two feet three inches; of womanly size. His hips would project beyond the oval that contains his shoulders; in boys we should expect the contrary. His face is rather that of a boy than a girl. He has a decided hemiplegia of the left side, the leg being, however, less affected than the arm, and he has a weak and sickly look, which does not promise longevity.

The penis is distinctly formed, about an inch and a quarter long, and proportionally thick, though not of the large African's size; the naked glans looks as if naturally circumcised. The orifice, instead of being at the top, is under the virga, thus constituting a clear case of hypospadias. The parents declare that he micturates from both organs, but less from the masculine. The urine, therefore, would pass through the frenum. No signs of testicles could be seen or felt.

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The frenum is attached to an orifice in the scrotum, resembling a real vagina, and not like those rugose openings in the medial line, which are so often found present. The labia are both well formed, and with a decidedly feminine smell. The colour of the mucous membrane is a pale and leaden pink. No nymphæ exist. The tender age of the subject prevented Dr. J. T. Taylor, of H.M's. Steamship *Serpent*, from passing probes, and menstruation had not yet taken place. The pecten is unusually large and thick; thick black curls extend in two parallel lines, fringing the parts, to the anal orifice.

It appears, therefore, that the so-called boy is a mere case of deformed clitoris, the feminine apparatus being abnormally developed. It will, however, be interesting to watch the progress of the case.

I have the pleasure to enclose a hand-sketch of the original, made by me; and Dr. Taylor has kindly undertaken to forward a photograph of the parts, made by a skilful artist, the engineer of H.M. Steamship *Serpent*.

I am, etc.,

RICHARD F. BURTON.

V.P. Anthrop. Soc. of London.

The Sec. Anthrop. Soc. of London.

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XIX.—*Some Remarks on Indian Gnosticism, or Sacti Puja, the Worship of the Female Powers.* By Edward Sellon, Esq.

Fanaticism, no matter to what creed it may appertain, has, in all ages and countries, paved the way for licentiousness. Thus, the austere principles inculcated by both the Saiva and Vaishnava Codes of the ancient Hindu faith, have by degrees merged in numerous subordinate sects, and led to the formation of various fantastic creeds.

Not the least curious of these creeds is the *Sacteya* (pronounced *Sharkt-ya*), to which it is proposed, on the present occasion, to direct your attention.

The worshippers of *Sacti*, or power, who possess numerous books in Sanscrit verse, have been gaining ground in India for some years, but have lately sustained a check at Bombay,* which may ultimately lead to their suppression. The *Sacteya* creed professedly acknowledges Brahma, Vishnu, Siva, and all goddesses and demi-gods, but declares them all to be subordinate to the great goddess, who is emphatically power. The creed is set forth in the remarkable and recondite volumes called *Tantras*,—books, some years since, almost sealed to foreigners, but a translation of which has at length been obtained. Some extracts from these books will be introduced into this paper.

The word *Tantram* signifies literally—art, system, craft or contrivance; prescribing the abolition of all caste, the use of wine, flesh, and fish (which the Brahminical code considers unlawful for Brahmins), with magical arts, diagrams, and the express adoration of the female sex. The *Sacta* sect is, in fact, what the Greeks called *Telestica* or *Dynamica*,† and like

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* Vide *History of the Maharajahs*, London, Trübner and Co., 1865.

† Taylor's *Apul.*, pp. 275, 276.

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gnosticism, inculcates great contempt of the acknowledged religion, the peculiarities of which are only alluded to as matter for ridicule. Like gnosticism, it teaches magic, and looks upon the causes and agents of evil as the gods of the world. Let it not be supposed, however, that the creed of the *Sacteyas* is a religion of a modern date; the Brahmins look upon the books describing it as undoubtedly ancient,—more ancient, indeed, than the Purans. The most popular of these books are comprised in the following, to which are here given equivalent titles,—most of them have been translated:—

1. *Sarada Tilacam*—The Masterpiece.
2. *Jyan Arnavam*—A System of Wisdom.
3. *Cula'narvam*—The Noble Craft of Thought.
4. *Gudha Cula'navam*—The Hidden Part of the Noble Art.
5. *Bagala Tantram*—The Litany of the *Vulva*.
6. *Ananda Tantram*—The System of Joy.
7. *Rudra Yamalam*—Conversations of Siva and his Spouse.
8. *Yogini Hriolayam*—The Heart of the Angel—This is also called *Yoni Tantram*.
9. *Siv' Archana Chaudrica*—Rules for the Worship of Blooming Girls.—[In the *Calpam*, cc. iii and iv, is a description of every limb of a woman, with the *Madan a'layam*, and how they should be adored.]
10. *Lyam' Archana Tarangini*—The System of Worshipping a Girl.
11. *Anand Calpa Valli*—The Rites of Delight.
12. *Tantra Saram*—Summary of the Craft.
13. *Tantra Rajam*—Illustrations of the Sublime Art: and numerous others.

The system advocated in these books is termed *Pancha-macaram*. In other words, the five mystical M's, in allusion to the five words beginning with M, viz., *Madya*, *Mamsa*, *Matsya*, *Mautra*, *Mithuna*, *i. e.*, wine, flesh, fish, magic, and lewdness; which have reference to the following as a proposed means for the attainment of beatitude in the next world:—

1. A total freedom from caste and distinctions of every kind.
2. A liberty of eating flesh and fish, and drinking wine.
3. Promiscuous sexual enjoyment.
4. The practice of magic, and the adoration of women.
5. The worship of demons and Yogini, *i. e.*, Powers.

The *Sacteyas* are divided into two sects: the *Daxin' ácháram* (or right hand), and *Vámácharam* (or left hand). Each sect renounces the established religion, and declares the worship

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of women supreme, every woman (according to them) being a *Sacti*, or image of the great goddess. Their rules for fasting, bathing, and prayer, are to the full as irksome as with the Brahmins themselves. The person worshipped is a woman or girl of the Brahminical caste (among the *Daxin' ácháram*), who is elegantly dressed, and adorned with jewels and garlands. One, three, or nine females are to be thus adored by one or more men; but in the left hand mode, there is only one girl and one worshipper.

In such sects, it is required that the woman be looked upon as actually and truly a goddess (for the time), and that the devotee is to regard himself as really the divinity who is worshipping her. Curses are denounced on him who looks upon her as a woman, or himself as a mortal, during the performance of the rite. In each sect, the professed object of the *Puja* is the attainment of long life, offspring, riches, or other blessings, or else the destruction of an enemy by magical means. Magical rites are used in both sects; and all the quaint ceremonies described in Horace, Lucan, and Virgil, regarding magic, correspond exactly to the rules in the *Tantras*. Sitting in a cemetery, fasting, procuring pieces of a corpse at the waning of the moon, erecting a diagram—a triangle, square, or octagon—and therein inscribing the name of the person to be destroyed or the object to be accomplished, with other rites, are described with great minuteness; yet these magical rites are not necessarily connected with the worship of the good goddess, but may be and are practised by even Mohamedans.

The *Vúmácharam* sect veil in deep mystery the rites which they practise. They commence by fasting and bathing, like the *Daximácháram;* but many of their observances are of a less innocent nature. The great feast, called *Siva Ratri*, is the period of the year when the Hindu worship of Venus is to be performed: other days are also named in their code besides the *Siva Ratri*, or *Dussera*. The person who wishes to perform the sacrifice is to select a beautiful young girl of any caste, a pariah, a slave, a courtesan, or nautch girl, would be preferred. She is called *Duti*, or "angel messenger," or con-

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ciliatrix, being the medium of intercourse between the worshipper and the goddess. She is also called *Yogini*, or nun, —literally, "one who is joined". The *Yogini Hridayam*, or "Heart of the Nun", is a book well known to these sectaries; it is usually known by the name *Yoni Tantram*, or, "Ritual of Vulva Worship", *Yogini* being used as an occult name of *Yoni* (*pudendum muliebre*). It is a peculiarity that no widow, however young and lovely, is ever selected. After fasting and bathing, she is elegantly dressed and seated on a carpet. The five acts—already mentioned in alluding to the letter M—are then performed in order, and the votary erects a magical diagram and repeats a spell. These diagrams are diverse. The spell called *Agni Puram* has for a diagram a "volcano", *i. e.*, a double circle, and therein a triangle, doubtless the same with the *atish kadr*, or "house of fire." Spells are always used. The devotee next meditates on her as *Pracriti* (Nature), and on himself as a deity. He offers prayer to her, and then proceeds to inspire her in each particular limb with some one goddess, of the host of goddesses. He adores, in imagination, every individual part of her person, and, by incantation, lodges a fairy in every limb and member, and one in the *Yoni*, as the centre of delight. The names of the female sylphs addressed to her are not very delicate, and need not be here further alluded to. Then follows the second, third, and fourth M; *i. e.*, he presents her with flesh, fish, and wine. He makes her eat and drink of each, and what she leaves he eats and drinks himself. He now strips her entirely naked, and strips himself also. He recommences to adore her body anew in every limb; from this the rite is often termed *Chacra Puja*, or worship of the members. He finally adores the *Agni Mandalam* (*pudendum muliebre*) with reverent language, but lewd gesticulations. The chapters on this rite, as contained in the *Ananda Tantram*, the *Rudra Yamálam*, the *Jyan Arnávam*, and the *Cula'navam*, are very singular.

The *Homam* and *Yagnia* are known to be the most sacred rites of Hinduism; and from these liturgies every consecrated expression is borrowed and adopted, in a manner so extremely indelicate that it strikes a European reader with the utmost

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astonishment. For example, in the *Ananda Tantra* we read—"special rites are used to divest her of all shame, and shame can only be annihilated by the use of wine" (viii, 46, 48); and in the *Acasa Bhairava Tantra* [c. 50, *Ucchhishta* Ganapati*], the following passages occur (Latin rendering) :—

1. "Spisso minio rubentem, nudæ puellæ visum cupientur | feminæ vulvæ oris gustum exoptantem libidini devotum. |

2. "Læva parte *Sactim deam* collocantem semper complexu sedulè | suis pedibus fidentibus (*i. e.*, to those who trust in him).

3. "Concupita fructuosa condonantem | corporeali formâ structum status naturalem omnes beatitudines condonantem | rosæ Sinensi magis rubentem variis ornatu comptum. |

4. "Nodum et uncum gerentem Deum a divis honoratum | Puella temporum ad latus pendentem novo amore [recubantem] junctum.

5. "Sonan habens elephantinas dentes, auribus facto vento prehensum quoad dentem a puellâ succulentos Dea humeros binos prendentem." |

Again, in the *Sri Vidyá*, which enjoins secrecy :—

"Such was the rule, sung by the inspired prophets, | For those who adore the young and lovely Sacti, | Revealed to none but the initiated few. | Keep it concealed, like the rosy lips that pout | Between the recess of thy thighs, O Goddess. | Hide this creed, so pure so excellent, | As closely as you hide your vulva cleft. | O hide this code of bliss, lady, from vulgar eyes."—

Again, in the *Agni Mandalam* [the volcano] :—

"Let the fuel of sacrifice be her decorations; let the altar of sacrifice be her middle; the pit of her navel is the hearth, and her mouth the ceaseless fire; the south point her chin; her rosy hand the spoon; let the *Sabhya* and *Avasadlya* be the two sides of the same. The holy flame is the moist vulva.

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* *Ganapati*, or *Gunesha*, here represented as Bacchus Spurcus, "the dirty god," and in the *Sacti Ganapati* he may be compared to Bacchus Eroticus, who resembled Priapus; but the *Silpi Shastras* speak of twelve Guneshas, who bore a very different character. Gunesh is always represented with an elephant's head.

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The fuel is collision (because fire is produced by friction), and the LORD LINGA is the great high priest."

Again, in the *Cama Cala*,—

1. "Let us laud the God and Goddess *Racta* (Parvati) and *Sucla* (Siva), ever glorious! Primary, noblest of fanciful blisses, | without compare! highest in glory, which is comprehended by the wise alone. |

2. "To the great and Holy one, accomplished in voluptuous movements, elevated in enjoying! | The *tejas* compounded of blood and semen, to him I bow! | Praise him, the supreme Lord of delight! noblest in faith, the only bliss of my soul (*Madia pámam*), the most secret *Vedha*, veneration.

4. "The bliss of all men, exalted on his throne. | To Siva, my Lord, soul-viewed, the form of bliss, the glorious! may he, with his slant glance, remove the foulness of mistrust. | By the holy art of enjoyment was the blessed science called amorous, aroma invented. How can it be denominated? The unmentioned," etc.

[Then begins the book called *The Spirit of Sexual Joy*.]

(Latin rendering.)

1. "Cunctorum mandorum origine statu, fatuque, confictum gaudium hâc in beatitudine acerrimum Quod interno animo conspicitur! Me tu catur, omnium Princeps! corpus quod habet mero splendore confictum!

(Some of this is passed over as merely introductory.)

3. "Comminem per coitum *Sivi* et vis | generatum semen et germinationem efficta est Illa Magna Podestes. | Unspeakable, incomparable in form, | inexpressible by writing, by figure, or by image. | [Thus far the introduction.]

4. "That sun, the supreme *Siva* (i. e., *Sucla*), whose rays are reflected in the heart, that in reflecting the glorious beauty, receives the great seed.

5. "That sense of individuality which is inherent in the mind, clearly expressed in the term A'HA'RNAM [A denotes *Siva, i. e.*, semen; and HA denotes *Sacti, i. e.*, POWER, typified by blood, the two are united by the mystic word.]

6. "Whiteness (semen) and redness (blood) when their re-

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spective fluids are united, a word and its import; so are united creation and its cause, mutually collocated and indivisible.

7. "The fluid is the source of individuality, and the (portion) abode of the sun is therein; and *Cama* (or Cupid) being the attractive power, is the *Cula* (spirit), and is the enjoyment.

8. "This is the discrimination of *Cula* (male and female joined *in coitu*), and is equivalent with *Sri Chacra*. He who knows to distinguish them is the freed, and shall assume the form of the great *Tripuri*.

9. "There is distilled from the red *Sacti* the mystical sound CLIM, which is denominated *Nada Brahma*, and the sound is audible; from it originate the ether, wind, and fire, and the terrestrial decade.

10. "Next, from the fluid thus made known, spring wind, fire, water, and earth, all the universe, from an atom up to a sphere.

* * * * *

13. "The three great POWERS are those of *Desire*, of *Knowing*, of *Loving*, and of *performing the act*.

14. "And in the same order are three Lingas, of tangible (*Sthula*) spiritual bodies, and visionary and this is *Tripura*, triple; and the fourth is the ART.

15. "Sound, touch, form, taste, and smell, and the essential qualities of each multiplied by the three *gunas* (qualities) of *Prithoi*.

16. "Hence originates the *Spell* of fifteen syllables.

17. "And there are fifteen *Tithis*.

18. "On the letters, consonants, and vowels.

19. "The ART is magic; the object is the goddess.

20. "From letter Y to letter S there are three forms.

21. "Between the *chacra* (members) and the goddess it is impossible to draw any distinction before the spiritual body is evolved.

22. "In the centre of the *chacra* let the mystic fluid be; this is the essential fluid.

23. "The three that are formed from the triple root," etc., etc.

From the passage here cited, it will be seen how closely the

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Sacteya rites resemble those practised by ancient Pagan peoples; they are expressly forbidden in the Mosaic law. "Ye shall not eat anything with the blood, neither shall ye use enchantment, nor observe times." Lev. xix, 26. "Giving his seed unto Moloch." "Who commit whoring after idols." Turning after familiar spirits, to go a whoring after them." Lev. xx, 2, 6.

The diagram, also, discovered by Cicero, on the tomb of Archimedes, appears identical with one of those spells used in the *Sacti Puja*,—"The apex of the triangle is downwards, with a point in the centre."

In India, the adorers of the goddess regard the mystical ring, or circle, as the orifice of the vagina, while the triangle represents the nymphæ; the dot represents the fairy lodged in this member. When the imagination of the *Sacti* is sufficiently excited by wine, divine homage, and libidinous excess, she is supposed to be in a *guyána nidra*, or mystic sleep, wherein, like the sibyls among the ancients and modern clairvoyants, she answers questions in a delirious manner, and is supposed to be for the time the mouthpice of the deity. The omen chiefly desired is that *emission may happen to the female before copulation;* but whether it happens before or not, it is received in a cup of consecrated wine, to which is added a morsel of flesh and of fish. This cup is then offered to the goddess, and the rite is concluded.

Such is the *Sacti Puja*, or worship of Power. Power here meaning the good goddess *Maya* (delusion); she is also called *Bagala, Vagala*, and *Bayala Mukhi*. She has neither images nor pictures, and is usually typified by a vessel of water. The girl who performs *Sacti* (for the time) is the only true representative of the goddess.

The Eleusinian mysteries bear a very striking analogy to the *Sacteya;* and those writers err who have asserted that the mysteries of Eleusis were confined to men. A reference to D'Hancarville* will give several instances of the initiation of *women*. The method of purification, portrayed on antique

* Naples edit., 1765, fol., tome iv.

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Greek vases, closely resembles the ceremony as prescribed in the *Sacti Sodhana*. From this circumstance, and also from the very frequent allusions to *Sacteya* rites in the writings of the Jews and other ancient authors, it is evident that we have now in India the remains of a very ancient superstitious mysticism, if not one of the most ancient forms of idolatry in the *Sacti*, or *Chacra Puja*, or worship of POWER.

CONCLUSION.

The author of the foregoing paper cannot bring it to a conclusion without saying a few words regarding the sources from which his information has been in the main derived. It would have afforded him great pleasure to have given the name of the very learned orientalist from whose valuable MSS. he has so largely drawn; but that gentleman made it an express condition that his name should not appear. It only remains, therefore, to add that he was a member of the Madras Civil Service for thirty years, a judge, and a man of letters, whose authority in all matters relating to the Hindus, their literature, and religion, is, in the strictest sense, reliable. At the same time his views, although in the main adhered to, have been in some instances departed from and modified, and the opinions of numerous other writers, ancient and modern, engrafted upon and incorporated with them.

A few Remarks in Reply to an Attack on a Paper published in the first volume of Memoirs of the Anthrop. Soc., entitled "Linga Puja."* By EDWARD SELLON, Esq.

THE anonymous writer of the article in question objects,

1st. That there is nothing Phallic in the worship of Vishnu.

2nd. That Buddhism is in no way connected with the worship of Phallus.

3rd. That the notion of the Ark of the Covenant of the Jews, containing a phallus, is wild, absurd, and improbable.

To these objections, the following answer may be given:—

First, with reference to Vishnu. The Vishnavas (or fol-

* Vide *Ethnological Journal*, December, 1865.

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lowers of Vishnu) do not, it is true, adore the Linga in its *masculine* capacity, they being Yonijas, or worshippers of the *female Sacti*, or Power. Now the Lingam represents not the male emblem *only*, but also the female, which the Hindus term *Yoni*; and I submit that the worship of the female organ of generation is to the full as "phallic" as the male. Sir William Jones (*vide* Works, vol. ii, p. 311) says, "It seems never to have entered into the heads of the Hindu legislators and people, that anything natural could be offensively obscene,—a singularity which pervades all their writings, but is no proof of the depravity of their morals: hence the worship of the Linga by the followers of Siva, *and of the Yoni by the followers of Vishnu.*" The writer of the article in the *Ethnological Journal* is counselled to read what Moor (in his *Hindu Pan.*) says of Vishnu, both under that head and also under the heading "Krishna." He will also derive instruction from a perusal of Wilson on *Hindu Sects* in the *As. Res.* I can only say that I have absolutely *seen* a great many black lingams dedicated to Krishna (avarta of Vishnu.)

Secondly, with regard to Buddhism. "Colonel Sykes, in his *Account of the Ellora Excavations* (near Poonah, in the Bombay Presidency), speaking of the Bisma Kurm, says, 'The first thing that meets the eye on entering the temple is the enormous hemispherical figure of the Ling (Lingam) at the end of the cave; it is *always found* on this scale in the arched *Boodh* excavations, and even at Tuneer, in a flat-roofed cave (also Buddhist), *this emblem* is forty-two feet in circumference though its height is inconsiderable.'"* Here, at all events, are two temples dedicated to *Buddha*, in which the *Lingam is found*, vouched for by a respectable authority. Now, let us see what can be said with respect to the phallic worship of Buddha in Japan and in China.

Mr. Adam Scott, a Chinese merchant, who visited Japan last year, states, that "they are Buddhists; but the name they give the god is *Dic Bootes*, not Boodh or Buddha, though his images are precisely like those of that divinity in China.

* Sykes, cited by Elliott, *Views in the East*, vol. ii, London, Fisher & Son.

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While in Japan he visited the phallic temple of Azima, situated on an island twenty miles west of Yokahama, accompanied by Admiral Kuper, and other officers of H.M.S. They found the temple on the summit of a "high hill," in the midst of a sacred "grove." On the altar they beheld a large Phallus of stone, while a vast number of smaller size, and of wood, lay strewn around. Mr. Scott supposes that these latter may have been votive offerings. He brought home to England two specimens of these Phalli; and they may be seen by the curious at the museum of George Witt, Esq., F.R.S., together with a carefully executed drawing of the temple, and the picturesque hill on which it stands. Dr. Dawson states that "he has seen women making votive offerings of Phalli at a Buddhist temple in Pekin." This is confirmed by Mr. Adam Scott; and there is a vast mass of evidence both in images, in drawings, and in MSS. (in the same museum), proving to the satisfaction of any reasonable man that the Phallic worship *does* exist in connexion with Buddhism, not in India only, but in Japan and China. At Siam, this worship is also known, and is alluded to in Ruschenberger's *Voyage of U.S. Ship Peacock*, in 1836, 1837, and 1838.

Lastly, I offer a few observations on the Ark (of the Covenant, so called). I have said in my paper on the Linga Puja, read before the Fellows of the Anthropological Society, that "there would also now appear good ground for believing that the Ark of the Covenant, held so sacred by the Jews, contained nothing more nor less than a Phallus," etc. I now proceed to give the grounds upon which I founded that supposition, for be it observed, I *asserted* nothing.

Bishop Colenso has clearly shown that the Syrian name of Baal (*Yahveh*) was absolutely the same as that of the Jewish God; that the Jews probably *took the name from the Pagan nations around them* [as before then they called their God *Elohim*; that both names had the *same signification*, Yaveh or Yakveh [or Jehovah], "*he makes to live*," or "*he makes to be*" (that is, he fructifies, fecundates, generates).* The *names*,

* *Vide* Bishop Colenso on *The Pentateuch*, p. 159, Appendix to Part II.

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therefore, being *identical*, and the attributes *identical*, I conceive that I am justified in considering that Jehovah and Baal, or, in other words, the Syrian *Yahveh* and the Jewish *Yahveh* were, in point of fact, *one and the same deity*, though not worshipped with the same images or ceremonies,—the Pagans exhibiting their Yahveh, or Baal Pehor, to the people "on every high hill, and under every green tree;" the Jews mysteriously concealing *their Yahveh* in an ark or coffer. That being my opinion, I have, in support of it, *first*, to prove what sort of a God this Yahveh, Yakveh, Jehovah, or Baal Peor, was; and having demonstrated *that*, I must then establish that it was a custom for other Pagans to have sacred arks as well as the Jews; and *secondly*, prove what it was those arks contained.

Yahveh, the Syrian god, was also called Baal, Baalpeor. Baal signifies "erect", "upward". Peor signifies "open", "spread". Now let anyone examine one of the unadorned stone Lingams (in the Indian Museum, Whitehall), and I say that he will there see in that Indian *idol a veritable representation of the Baalpeor of the Bible*, viz., the *Yoni*, "open", "spread", and the "erect" Linga in the centre. "So, again, with regard to the Egyptians", says Plutarch, "there is good reason to conclude that they were wont to liken this *universal nature* to what they called the most beautiful and perfect *triangle;* the same as does Plato himself in that nuptial diagram, etc. Now, in this *triangle* which is rectangular, the perpendicular side is imagined equal to three; the base to four; and the hypotenuse, which is equal to the other two, containing sides, to five. In this scheme, therefore, we must suppose, that the *perpendicular* is designed by them to represent *masculine* nature, the *base* (yoni) the feminine, and that the hypotenuse is to be looked upon as the offspring of both", etc.*

Yahveh, or *Yakveh*, signifies "he makes to live", or "he makes to be"; that is, he gives life, he fructifies, generates. What more suitable than these names for a phallic divinity?

* Plutarch, *De Iside et Osiride*, lvi.

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The custom of having a sacred ark or coffer placed in the sanctuary is of great antiquity, and was not peculiar to the Hebrews. Long ere the Jews became a people, the Egyptians had their arks. Let those who doubt this, read what Mr. King has to say on the subject, when speaking of Isis and her mystic ark or coffer. "In it was carried," says this writer, "*the distinctive marks of both sexes, the Lingam and Yoni of the modern Hindus.*"*

Speaking of the mystic ark, Clemens of Alexandria (cited by Spencer, *De Leg. Heb.*, p. 45), says, "In which was only deposited the privy member of Bacchus". And Spencer adds, that in some of the Pagan arks (plainly proving that they had such coffers), in them "were laid up Indian wheat, pyramids, pieces of dressed wool, cakes or wafers made of oil and honey (full of studs and bosses like navels), used in sacrifice, a serpent, Persian apples, and a *thyrsus; i.e.*, a *phallus*.†

Of course, it is not to be expected that persons who believe that Moses wrote the Pentateuch, that the Jews were the chosen people of God, and that everything narrated of them in the Bible is true,—it is not to be expected, I say, that such persons will accept, or see any force in the few proofs I have hastily, and at but short notice, thrown together.

To them I do not address myself; I merely threw out a suggestion, in the first instance, in my paper on the "Linga Puja", and I have here given some proofs that I had grounds for so doing, and I appeal to the deep thinkers, the philosophical reasoners of this age of light, to work out the problem. For my part, I shall be quite satisfied to abide by the decision of such men; but for the opinions of individuals prejudiced and blunted by their faith in an effete and preposterous religious system, and by the conventionalities of the society in which they move, I shall ever have the supremest contempt.

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* *Gnosticism*, by C. W. King, M.A., London, 1865, p. 154.

† *Vide* Spencer, *De Leg. Hebr.*, p. 145.

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XX.—*On the Resemblance of Inscriptions found on Ancient British Rocks with those of Central America.* By Berthold Seemann, Ph.D., Vice-President A.S.L.

Mr. George Tate, our Local Secretary at Alnwick, has recently published an account of *The Ancient British Sculptured Rocks of Northumberland and the Eastern Borders, with Notes of the Remains associated with these Sculptures,* illustrated by lithograms. This is the most comprehensive, as it is the most valuable, account as yet published on the incised stones, the first specimens of which were brought to light nearly half a century ago, by Mr. J. C. Langlands, near the great camp on Old Bewick Hill, in North Northumberland, and additions to which have been made, in various other parts, by different zealous antiquaries, including the author of the just mentioned publication. These inscribed rocks are held to be of great antiquity, and to have been the work of tribes who occupied the British islands long before the Roman invasion. The notion that they originated with the Roman soldiers trying to pass away the dull hours of camp life, being entirely opposed to the fact that no Roman characters of any description occur among them, and that they are found in parts of these islands never trodden by the foot of the Roman conqueror. The geographical distribution of these rocks is interesting. In Northumberland, where they abound, they do not occur on the Cheviots or their flanks, and this has been held to be a negative proof that these sculptures were made by a people who were ignorant of the use of metallic tools, and could not produce any impression on the porphyry of the Cheviots by their stone tools, when they easily effected it on the sandstone of the Northumbrian moorlands. "These inscribed rocks," says Mr. Tate, "occur on one or other of the beds of thick sandstone, which is near the base of the mountain limestone formation, and which forms the substance of the high moor-

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lands of Northumberland, rising up, in some cases, to the height of 1,400 feet above the sea-level. On the rough surface of the rock, where it crops out in different platforms on these hills, we find these sculptures. In the north-west part of the district, they occur on the upper surface of the cliffs near Routing Linn, about six miles northwards of Wooler; they are scattered in great profusion on the ridges in the moorland at Harelaw, Horton, and Doddington, and on Gledlaw; they are on the outbreak of rocks at Caddy's Cove; they are found on the summit of Whitsunbank, Chatton Law, and Old Bewick Hill; they have been found in Beauley and North Charlton Moors; they existed in Cartingdon Cove, near Rothbury; and they have been discovered, but not *in situ*, in the parish of Stamfordham. When found *in situ*, they are always in high grounds, generally on lofty hills, some of which are nearly 800 feet above the sea-level." In all, fifty-three sculptured stones have been observed in Northumberland, on which three hundred and fifty figures are inscribed. All of them are more or less connected with ancient British remains; four of them formed the cover of cists; two are within a few yards of barrows, beneath which are similar small sepulchral chambers; five of them are within ancient British camps; eight of them are not more distant from such camps than one hundred yards; most of the others are less distant than half a mile, and none further away than a mile. Their relation, however, to the camps, forts, and hut-circles—the dwellings of the ancient British people—is more apparent than to their sepulchres. Stones with similar or absolutely identical inscriptions, have been found in Ayrshire, Yorkshire, Scotland, the Orkneys, and Ireland, for details of which Mr. Tate's excellent work must be consulted; but curiously enough, none have been discovered in Europe beyond the limits of the British islands.

In Brittany, where so many Druidical remains have been preserved, and where we might expect to meet with them, we search in vain for the concentric rings so frequently repeated, and the Northumbrian and other ancient British rocks. Some sculptures on the rock-temples of Malta, referred to prehistoric

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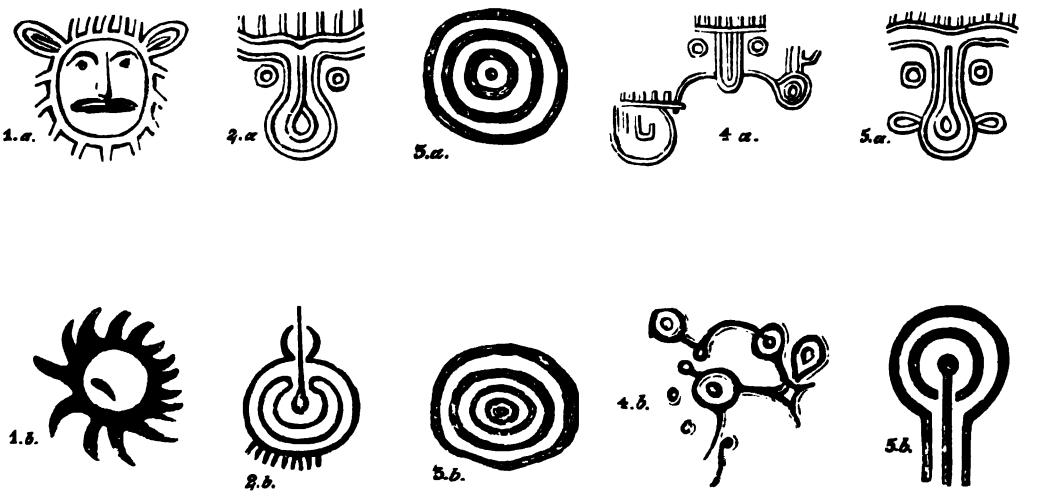

INSCRIBED ROCKS OF VERAGUAS.

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ages, are *circinate* lines, which may have some reference to serpent-worship, and, like some rude figures of eggs, may be due to Phœnician workmen. Nor can any connexion be established between our British rock-sculptures and certain Egyptian hieroglyphics. In fact, we search in vain throughout the whole eastern hemisphere for the least approach to the rude but characteristic figures inscribed on the British rocks.

It is, therefore, all the more singular that, thousands of miles away, in a remote corner of tropical America, we should find the concentric rings, and several others of the most typical characters engraved on the British rocks. I discovered them near the town of David, Veraguas, New Granada, in the spring of 1848, and read a paper about them before the Archæological Institute shortly after my return to London in 1851. A brief account of them was given in my *Narrative of the Voyage of H.M.S. Herald*, vol. i, p. 312, London, 8vo, 1853, but the drawings illustrating them were unfortunately omitted, the publisher objecting to them on account of the expense; but some of them were afterwards placed by me at the disposal of Mr. Bollaert, and published by that gentleman in his *Antiquities, etc., of South America*, 8vo, London, 1860, whilst others have been, it is feared, entirely lost, especially those which would have established the identity of the British and Veraguas inscriptions beyond doubt *in the minds of others*. For my own part, I was so much struck with the general resemblance, not to say identity of the two, that when the plates of Mr. Tate's work were first shown to me, and I was quite ignorant to what country they related, I fully believed them to represent Veraguas' inscriptions. Even from the drawings I still retain, part of a Veraguas work, I am able to pick out some of the most typical characters found on the British rocks, as the accompanying diagrams will show.

Fig. I, represents two radiant suns,—*a*, the American, *b*, the British character; in Veraguas this character has been found but once, nor does it occur oftener amongst the published British figures.

Fig. II, *a*, the American; *b*, the corresponding British figure, showing several grooves radiating from an outer arch, and

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bearing some resemblance to what is termed the "Ogham characters."

Fig. III, *a*, the American; *b*, the corresponding British figure, showing the completely closed concentric circles.

Fig. IV, *a*, the American; *b*, the corresponding British figure, showing how the various characters (symbols) were connected by lines leading from one to the other.

Fig. V, *a*, the American; *b*, the corresponding British figure, showing the groove or outlet of the circle.

The characters in Veraguas are like those of Great Britain, incised on large stones, the surface of which has not previously undergone any smoothing process. The incised stones occur in a district of Veraguas (the Canton of Alanje), which is now thinly inhabited, but which, judging from the numerous tombs, was once densely peopled by a nation which manufactured some elegantly shaped pottery, wore ornaments made of gold of a low standard, called *quanin* (most probably a natural alloy of gold and copper), buried their dead in stone cists, accompanied by their weapons, ornaments, pottery, and other household articles, and became known to Columbus in his fourth voyage of discovery.

This very same people, who are supposed to have been the Dorachos or Dorazques, had also made considerable progress in sculpturing columns, and placing on them raised characters. Several of these columns, about ten to twelve feet long, were knocking about the streets of David, the capital of Alanje, or Chiriqui, during my visit in 1848, and numbers are said to occur on Mueto, and other places. Had they been less bulky, I should have brought a specimen of these home with me. Raised characters require, of course, more artistic skill than incised ones, and hence denote a higher degree of civilisation. If, therefore, the people who readily engraved their thoughts on the *piedra pintal*, and other stones, of which it is the type, are assumed to have been the same as those who expressed them in raised characters on the columns of which I saw specimens at David, a long period must have elapsed before tools could be brought to such perfection as to allow the employment of inscriptions in relief on a previously

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smoothened surface. But there is no identity of, or even distant resemblance between, the incised and raised characters, and we need, therefore, not trouble ourselves any farther about this point. The identity of the two being abandoned, it may just be worth while to consider the possibility of their being executed by contemporaries.

In highly civilised countries, such as ancient India, Egypt, and modern Europe, different modes of expressing thoughts have been and are practised; but the most advanced people who ever inhabited Veraguas, had not attained so high a degree of civilisation as would justify us in assuming that they resorted to two entirely different systems of recording their ideas. It is, therefore, scarcely possible to escape the conclusion that the incised characters were by a different, less civilised, and more ancient race than the characters in relief.

From information received during my visit, and from what has been published since I first drew attention to this subject, I am led to believe that there are a great many inscribed rocks in Chiriqui.* But I myself have seen only one of them, the now famous *piedra pintal* (*i. e.*, painted stone), which is found on a somewhat elevated plain at Caldera, a few leagues from the town of David. It is fifteen feet above ground, nearly fifty feet in circumference, and rather flat on the top. Every part, especially the eastern side, is covered with incised characters about an inch or half an inch deep. The first figure on the lefthand side represents a radiant sun, followed by a series of heads, or what appear to be heads, all with some variation. It is these heads, particularly the appendages (perhaps intended for hair?), which show a certain resemblance to one of the most curious characters found on the British rocks (fig. II, *b*), and calling to mind the so-called "Ogham characters." These "heads" are succeeded by scorpion-like, or branched, and other fantastic figures. The top of the stones, and the other sides, are covered with a great number of concentric rings and ovals, crossed by lines. It is especially these which bear so striking a resemblance to the Northum-

* See Bollaert, "Ancient Tombs of Chiriqui," in *Journ. Ethnol. Soc.*, vol. ii, pp. 151, 159.

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brian characters, and it is the more to be regretted that some of the drawings relating to them have been lost.

I have always rejected the idea that these figures are intended for mere ornament. Symmetry is the first aim of barbarous nations in their attempt to ornament a thing. On the contrary, I have always taken them to be symbols full of meaning, and recording ideas held to be of vital importance to the people who used them, and whose very name has become a matter of doubt. To speculate on their meaning must be labour thrown away, until we shall have become acquainted with all the inscriptions, of which those on the *piedra pintal* are a specimen.

My principal aim in penning these lines is to direct attention to the remarkable family likeness, if nothing more, existing between the ancient British and Veraguas inscriptions,—a relationship entirely unsuspected by me until, by a lucky accident, Mr. Tate's remarkable work fell into my hands,—and thus direct investigation into a new channel. Could an *identity* be established between these rocks, so widely separated geographically, we should then be in a position to indulge in legitimate speculation, the conclusions of which a leading literary journal has already anticipated. We should have to concede—I say it without hesitation—that, in prehistoric times, an intercourse existed between the British islands and Central America; that this intercourse could not be maintained with the small crafts which so rude a civilisation could send across the wide Atlantic Ocean; that a land communication was absolutely necessary to ensure such an intercourse; that it could not have been carried on by way of Asia without leaving numerous traces behind; that no such traces have been found; and that, consequently, it must have taken place when the Island of Atlantis—in the hands of modern science no longer a myth—was so intimately connecting Europe and America that the woods, which then covered Europe, were identical with those *still existing* in the southern parts of North America; that before science can concede all these, or similar speculations, we want more facts, which, it is hoped, may be forthcoming now that it has been shown what great interest attaches to them.

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XXI.—*On the Alleged Sterility of the Union of Women of Savage Races with Native Males, after having had Children by a White Man; with a few Remarks on the Mpongwe Tribe of Negroes.* By R. B. N. Walker, F.R.G.S., F.A.S.L., Local Secretary A.S.L., etc., etc.

Count Strzlecki has asserted that women of certain savage races, who have been impregnated by Europeans, or who have even cohabited with one, become sterile with men of their own race, and bases his statement on observations made by himself amongst some tribes of American Indians, Polynesians, and aboriginal Australians. This theory has been adopted and strenuously supported by Mr. Alexander Harvey, who gives it as his opinion that Count Strzlecki's "assertion has been ascertained to be *unquestionable*, and must be considered as the expression of a law of nature."* These opinions have already been controverted by competent observers in Australia; and I propose, in the following brief remarks, without venturing to enter into any discussion of the subject, simply to put on record a few well-authenticated cases which have come under my own eye in Western Africa, during a residence of many years, which go to prove that the conclusions arrived at by Count Strzlecki, and his supporters, do not hold good in at least one well-known tribe of pure Negroes, the Mpongwe of the Gaboon. In the instances which I shall cite, I shall confine myself strictly to living individuals, and thus afford others an opportunity of obtaining corroborative testimony from other sources should they be so disposed.

Considering the long period during which the Gaboon country has been known to, and visited by Europeans of various nations, it is somewhat remarkable that so few cross-

* Broca's *Phenomena of Hybridity in the Genus Homo*, edited by C. Carter Blake, Esq., p. 55.

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breeds should exist there; but although intercourse between Europeans visiting the country and the native women has been frequent, there have doubtless been influences at work which have tended to render the births of Mulatto children comparatively rare; among these causes, the most prominent are the noted infidelity and incontinence of the women, and their great addiction to strong drinks, which, in the shape of trade-rum, and other spirits of inferior and deleterious quality, are unfortunately too easily attainable. The number of Mulattoes in the first degree, born in the Gaboon country, and now living, certainly does not reach twenty; in fact, I only know of fifteen individuals. Although the nationality of the fathers of these half-breeds does not form a part of the object of this paper, it may not be amiss to notice it *en passant*, as some authorities hold that Negro women breed more freely with Europeans of the Latin than of the Anglo-Saxon race. Such is not the case here. Of the fifteen Mulattoes known to me in this river, six are of English paternity, five claim French fathers, one is the child of a German (Alsatian), one is of Spanish extraction, one Portuguese, and the remaining one is the offspring of a deceased slave-trader, but whether Spaniard or Portuguese the natives are now unable to say with certainty. I never heard of a native woman having had a child by a white American (of the United States). Considering the vast preponderance, of late years, of French residents and visitors over all other nations, it is worthy of remark that there should be so few children resulting from the intercourse of men of that nation with the women of Gaboon. As a rule, these half-breeds, without respect to their paternity, are sickly and weakly, but few of them living to adult age.

I will now give three instances of native Gaboon or Mpongwe women having children by native males, after having cohabited with, and borne children to, Europeans,—singularly enough, the only known cases here are those in which an Englishman has been the father of the Mulatto.

The first case, that I have any knowledge of, is that of an Mpongwe woman of pure blood who, when young, cohabited with an Englishman, and had a female child by him; after-

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wards, marrying a man of her own tribe, she had two full Negro children, male and female.

The second instance is that of a Mpongwe woman, who had a male child by a white man with whom she lived, and having later taken a Mpongwe husband, gave birth to a male child, full Negro, about six years after the birth of her first child of mixed blood.

The third is the most remarkable case, as in this one a full blooded Negress lived for some time with an Englishman, when young, but at that time had no children by him; but having married one of her countrymen, bore him two female children; and a year and a half after the birth of the youngest of these, she had a female child by the Englishman with whom she had previously lived, and with whom she was again cohabiting; three or four years later still, she gave birth to a boy, whose father was her native husband.

This latter case especially, I think it will be admitted, destroys the theory of Mr. McGillivray, "that the embryo, whilst *in utero*, subjects the mother, by some sort of inoculation, to organic or dynamic modifications, the elements of which have been transmitted to the embryo by the father, and the mother will then retain the impress permanently."*

Instances of native women cohabiting with Europeans, without having children by them, and afterwards marrying native husbands and becoming prolific, are not only not rare, but, on the contrary, are quite frequent; and so far as I have remarked, their long intercourse with white men has by no means diminished their fertility when living in the more natural union with men of their own tribe and colour. As several of the fifteen half-breeds, mentioned in this paper, are the first children of their mothers, I shall note if at a future period those women bring into the world children of pure Negro blood. It is by no means unworthy of mention here, that, until within the last few years, the Mpongwe people themselves entertained the idea that a Negress, having had issue by an European, would not afterwards breed with a man

* Broca's *Phenomena of Hybridity in the Genus Homo*, p. 56.

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of her own race; and in the reverse case, that having had had children by one of her own countrymen in the first instance, she would be sterile with an European.

With regard to the fertility of half-breeds amongst themselves, my experience in this place is against it. I know of only one instance, and in that the woman was by no means prolific, only giving birth to one child; but it should be observed, in relation to this subject, that on this part of the coast but few opportunities are afforded of watching the result of intermarriages among Mulattoes, as in the extremely rare case of a half-breed girl reaching puberty, she is generally married by some native chief or influential man; as I have before said, the majority of Mulatto children die young.

I believe that my own experience, as to the fact of Negro women breeding both with Europeans and males of their own race, would receive corroboration from the other parts of Africa if the Council of the Society would request Fellows, resident at the different settlements, to inquire into the subject, and report the result of their investigations; for my own part, I shall continue to collect facts bearing on the question. But, so far as the Mpongwe tribe is concerned, I fear that opportunities of making observations must soon cease to exist, for it is probable that in a few years the Mpongwe people will cease to have any existence as a distinct tribe, though a few individuals may remain among the surrounding nations. One-third of this tribe has been carried off by small-pox during the last year; many die yearly of pulmonary and other diseases; drunkenness, and worse vices, destroy numbers, whilst the births are no means equal in amount to the deaths. This is to be regretted, as the Mpongwe people are amongst the most remarkable races on the coast, evincing a great aptitude for adopting the habits of civilised nations, though unfortunately they, in common with all Negroes, are more ready to acquire the vices than the virtues of their European visitors. They have, for many years past, been of great service to European traders on neighbouring parts of the coast as interpreters and factors, being good linguists, and remarkably fond of trading, but since the failure of the slave-

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trade they are becoming as poor as they are dishonest. It is very remarkable that, notwithstanding the great facility with which these people accustom themselves to European habits, both the American Protestant and the French Roman Catholic missionaries, after upwards of twenty years labour among them, have utterly failed to effect any improvement in their honesty or their general morality; in fact, the very worst of them, in every respect, are those who have received instruction in the mission schools,—if there be any difference, the Protestant converts carry off the palm for superlative rascality.

In my approaching journey into the interior, I shall visit the Adjomba nation, of which the Mpongwe tribe is an offshoot; the same language is spoken by both, but the communication that exists between them is so very limited as to be scarcely worthy of mention, being, in fact, hardly known to many European residents, who have never heard of such a people as the Adjomba, although their country is only distant some seventy or eighty miles from the settlement at Gaboon. It will be a curious and exceedingly interesting matter of investigation as to the degree of difference or resemblance existing between the parent nation, that has had no intercourse with Europeans, and the branch that for many years—nay, generations—has been in constant and intimate contact with so many nations of civilised Europeans and Americans.

I propose making some little stay in the Adjomba country, which will be the first stage of my journey; and should it be my good fortune to return safely, I shall have great pleasure in laying before the society the result of my observations, which cannot fail to be of interest.

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XXII.—*On the Analogous Forms of Implements among Early and Primitive Races.* By Hodder M. Westropp, Esq., F.A.S.L.

The most remarkable feature in the early periods of man's history, is the almost identity—for it is more than a striking analogy—in the instruments of warfare, and tools used in countries the most widely apart. Man, in all ages and in all stages of his development, is a tool-making animal. His instincts and necessities lead him to fashion instruments and tools suited to his requirements. However different in race, and dwelling however remotely apart, we find in him the same wants and necessities,—the same natural instincts and spontaneous powers of suggestion, contributing their aid in ministering to the needs of his nature, which he shares in common with the whole human family. The same universal processes of mind and instinct will lead the Australian, the New Zealander, the Peruvian, the Scandinavian, to fashion and shape a stone weapon. A state of warfare was evidently the state of man in his earliest and barbarous stage, as Horace, as quoted by Sir Charles Lyell:—"When animals first crept forth from the newly formed earth, a dumb and filthy herd, they fought for acorns and lurking places with their nails and fists, then with clubs, and at last with arms, which, taught by experience, they had forged." To form instruments of destruction to indulge his combative propensities, thus seems to have tasked the earliest powers of suggestion in man. Hunger and cold led him also to invent implements for the purposes of the chase, in order to supply himself with food, and a covering for his body from the skins of animals.

The weapons and implements devised and fashioned by man, in each stage of his development, are almost identical in all countries; and this similarity affords strong evidence of the uniformity of the operations of instinct, and the suggestive

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principle in the mind of man, among all races and in all ages. These warlike and useful implements present identical forms, according as we consider them under the different epochs of flint, stone, bronze, or iron; and this sequence in the forms of the implements adopted during these successive periods, which are evidently worked out independently among different races, is obviously the result consequent on the progressive stages in the development of man, which proceed uniformly among all races. For there is evidence that all nations, in their earlier times, have proceeded in an invariable sequence through the periods marked as flint, stone, and bronze ages, before they arrived at the more advanced iron age.

The earliest known forms of weapons used either for purposes of warfare or the chase, are the implements found in the gravel drift. It has been remarked, that the great characteristic of these worked flints is their striking resemblance to each other in almost every country where they have been found. They present identical forms, obviously the result of identical intention. The flint implements of the gravel drift found in England, exhibit the same distinctive features peculiar to those found at Abbeville and St. Acheul in France. They are of the rudest nature, as if formed by a people in the most degraded state of barbarism. According to Mr. Evans, "the flint weapons found in conjunction with elephant remains, imbedded in gravel, overlaid by sand and brick-earth, present no analogy to the well-known implements of the so-called Celtic or stone period. They have appearances of having been fabricated by another race of men, and on a much larger scale, as well as of ruder workmanship." They are thus evidences of a much earlier stage of development, and of an age of ruder strength, and still more infantile skill; perhaps, too, of an earlier species of a human-like race, the companion and contemporary of the extinct bear, the extinct rhinoceros, the mammoth, and other larger animals, no longer in existence.

The next period is the stone age. Stone implements are found in all countries, and are thus witnesses of a period of early and imperfect civilisation, being the most simple instru-

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ments, such as would be suggested to man in his primitive and barbarous state, either as destructive instruments for supplying himself with food by the chase, and for warfare or defence, or as useful implements for constructing habitations, or forming boats or rafts. Stone implements are found among all primitive nations throughout the world, whose maintenance chiefly depended on their energy and ingenuity while unacquainted with the harder metals. The men who adopted these stone implements were evidently a hunting people, and consequently in one of the earliest stages of the human race, as is shown by the partly devoured bones of the urus, the deer, the megaceros, the roe found in connexion with them. Their similarity is here, also, a striking feature. The stone axe of the South Sea islanders of the eighteenth century presents a close resemblance to that of British or Gaulish fabrication of the earliest centuries. The similarity of the weapons or instruments, flint, stone, or bronze, being always according to the stage of development of the race, or country in which they are found, and not always according to a period of time. Their presence is thus not always an evidence of high antiquity, but of an early and barbarous state; for stone hatchets are found in common use, at the present day, among the South Sea islanders. Some tribes of Indians have been recently met with by Mr. Chandless, near the sources of the Purûs river in Peru, still using their primitive stone hatchets. The remoteness of the stone period must, therefore, be inferred from the relative antiquity of the country in which they are found. Thus, the flint or stone implements found in India or Egypt will belong to a remoter period than those found in Denmark or Ireland; while the latter will be witnesses of an earlier age than those which are met with in New Zealand or Australia.

Stone implements are found in countries the most widely apart, and are not peculiar to any distinct race, but are naturally suggested to any race of men in a rude and imperfect stage of civilisation, and are peculiar to that stage alone. They are found in Scandinavia, Britain, Ireland, France, Italy, Asia, America, Africa, Japan, Teneriffe, New Zealand, Aus-

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tralia, the South Sea Islands,—all, whether modern or thousands of years old, presenting a marked uniformity. As Professor Worsaae remarks, "the weapons and instruments of stone which are found in the north of Europe, in Japan, in America, the South Sea Islands, and elsewhere, have, for the most part, such an extraordinary resemblance to one another in point of form, that one might almost suppose the whole of them to have been the production of the same maker. The reason of this is very obvious, namely, that their form is that which first and most naturally suggests itself to the human mind."

The distinctions, indeed, are so marked between the different stages of the stone period, that they may be divided into three, corresponding with the phases of civilisation visible in man. 1. The flint implements of the gravel-drift, evidently used by man in his lowest and most barbarous grade. 2. The flint implements found in Ireland and Denmark, which belonged to a people who lived by the chase. 3. Polished stone implements, which mark a more advanced stage, perhaps a pastoral age. The following terms may be used to distinguish them:—Palæolithic, Mesolithic, Kainolithic.

The desire to attack his enemies from a greater distance, and to engage in the chase, has suggested also to man, in this early age, the use of the arrow. Hence, arrowheads of flint or stone are found in the same countries of a corresponding age, or period of civilisation. Their striking resemblance is also very remarkable. The arrowheads of flint found in America are scarcely distinguishable from those found in Ireland.

In the next age, the manufacture of bronze weapons may be considered as a further improvement on the fabrication of stone implements, consequent on the knowledge of the harder metals, the improvement corresponding with the grade attained to in civilisation. The adoption of metal, however, was neither sudden nor universal. The transition from the rude instruments of stone to those of bronze must have been very gradual, and possibly extended over many centuries. The bronze instruments and weapons peculiar to this epoch, found

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in Egypt, Denmark, Italy, England, France, Spain, Ireland, Africa, and America, also bear distinct analogies in form to one another, as Sir William Wilde observes, "Like its predecessors in stone, the metal celt had a very wide distribution, and has been found in every country in Europe, from the river Tiber to the Malar Lake, but differing slightly in shape and ornamentation from those found in the British isles." Like the stone implements, they are not peculiar to any race, but are suggested to any primitive nation, as a necessary result of an invariable sequence in its progressive development. We may add, adopting Professor Worsaae's words, "the antiquities belonging to the bronze period, which are found in the countries of Europe, can neither be attributed exclusively to the Celts, nor to the Greeks, Romans, Phœnicians, Sclavonians, nor to the Teutonic tribes. They do not belong exclusively to any people, but have been used by the most different nations *at the same stage of civilisation.*" We must, however, remark, that however like in form these implements seem to common observers; still there are distinctive characteristics, however slight, of each race in each type of implement, easily distinguishable by the practised eye.

Further, besides remarking the obvious analogy of form in these bronze implements in different countries, it is also remarkable that nearly the same proportions (ten or twelve per cent. of tin) result from the analysis of the bronze weapons found in the sepulchral barrows of Europe, of the nails which fastened the plates with which the treasury of Atreus at Mycenæ was covered, of the instruments contained in the tombs of ancient Egypt, and of the tools of the Mexicans and Peruvians, the same powers of suggestion in man, operating alike in all countries, and leading him not only to the discovery and fabrication of like forms of weapons, but also the invention and use of similar materials.

The simplest form of bronze hatchet is a cuneiform, or wedge-shaped piece of metal, evidently modelled on the type of the large stone hatchet; at a later period it assumes a more ornamental form, or a shape better suited for being attached to the wooden handle with which it was used, as in the so-

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called "winged celts" or "palstaves" in Ireland and Denmark. The earlier form of hatchet was merely inserted in the handle, and sometimes tied to it. Palstaves—or those bronze instruments in which the side edges project into flanges so as to form grooves for the reception of the cleft handle—are found in endless varieties of shapes in many countries, Denmark, Switzerland, France, England, Ireland, Etruria, Magna Græcia, each of these countries exhibiting evidences of a sequence of flint, stone, and bronze periods; thus confirming the inference that man's inventive and suggestive faculties, operating alike in each stage of his development and in all races of men, will lead him, independently and without connexion, to fashion and invent, under similar circumstances and according to that stage, almost similar weapons and implements to supply his wants and necessities, each style of implement being peculiar to, and belonging exclusively to, each separate period or phase of civilisation.

In a later age, when iron was known and generally adopted, the earlier forms of instruments were still retained for some time, until the rapid progress of civilisation and refinement caused them to be thrown aside. According to Sir William Wilde, "In the Copenhagen Museum may be seen celts and hatchets of iron, and of comparatively modern date; and in the central parts of Sweden, the short iron hoe or pick, used by the peasantry in grubbing up roots of trees, is not much larger than and greatly resembles some varieties of the ancient bronze celt." Iron, however, once known, advancement was more rapid. We need not speak further of the iron age, as it is not peculiar to early and primitive nations, but is evidence of an advanced and more perfect state of civilisation, and a progress towards the culminating period of man's development.

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XXIII.—*Report on Explorations into the Archaic Anthropology of the Islands of Unst, Brassay, and the mainland of Zetland, undertaken for the Earl of Zetland and the Anthropological Society of London.* By JAMES HUNT, Ph.D., F.S.A., F.A.S.L., Hon. For. Sec. of the Roy. Soc. of Literature of Great Britain, For. Assoc. of the Anthrop. Soc. of Paris, Hon. Fellow of the Ethnol. Soc. of London, Cor. Mem. of the Upper Hesse Soc. for Nat. and Med. Science, and of the Med. Assoc. at Hesse Darmstadt, Mem. of the Dresden Academy, and President of the Anthrop. Soc. of London.

IN the first volume of *Memoirs of the Anthropological Society of London* (p. 296), there appears a short notice, entitled "On the discovery of large Kistvaens in the Muckle Heog, in the Island of Unst (Shetland), containing Urns of Chloritic Schist," by George E. Roberts, Esq., F.G.S., F.A.S.L. This paper was made up from letters sent to Mr. Roberts by Thomas Edmonstone, Esq., of Buness, in the Island of Unst, to whose interest in the subject we are indebted for possessing these interesting relics. Mr. Edmonston sent all the urns and skulls found on the Muckle Heog to a local museum, which is being formed at Lerwick, the chief town in the Zetland Islands. A notice of these discoveries was inserted in the northern papers; and Mr. Roberts, then one of the Honorary Secretaries of the Anthropological Society, at once wrote to Mr. Edmonston, and asked for further particulars. This gentleman not only promptly complied with his request, but put all the objects which had been found at the entire disposal of Mr. Roberts.

Mr. Roberts, on reading his paper, exhibited the objects before this society, and suggested the desirability of further research. This proposal having met with approval, Mr. Roberts entered into a correspondence with the Earl of Zetland, K.G., on whose property was situated the hill called the Muckle Heog,

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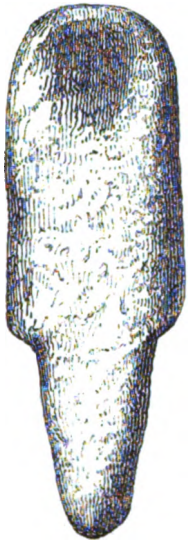

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ZETLAND IMPLEMENTS.

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and the result of this correspondence was an offer on the part of the Earl of Zetland to give fifty pounds towards the expenses, if the Anthropological Society of London would appoint some one to carry out the explorations. The Council asked Mr. Roberts to undertake a visit to Zetland, but that gentleman being unable to comply, I was myself induced to superintend the investigations. Perceiving the desirability, and indeed necessity, of an efficient coadjutor, the society consented to pay the expenses of some gentleman to accompany me. The Council appointed Mr. Ralph Tate, F.G.S., F.A.S.L., for that purpose.

We started from London on June 21st, and arrived at our destination in the Island of Unst on the 28th. We were received by Mr. Edmonston with the greatest hospitality. That gentleman had taken the trouble to make many inquiries into the antiquities of the island; and also to secure, from the superintendent of the Cromartie Iron-works the services of men employed there for the excavations that would be necessary. We were especially indebted to Mr. Edmonston for his hospitality, as the absence of inns on the island would have rendered our proposed work a matter of great difficulty without that kindness. Mr. Edmonston being unfortunately an invalid, was unable to accompany us, but he provided us with an excellent guide in Mr. William Mowatt, whose local knowledge of the Island of Unst is, perhaps, unequalled.

On the first day, we took workmen to the Muckle Heog to continue the excavations of which we had received accounts in Mr. Roberts's paper. The discovery of the skulls found on the Muckle Heog had been made whilst digging a place for the erection of a flagstaff at the top of the hill. The workmen employed for this purpose came on some human remains which have already been described by Mr. Carter Blake.* At the time of our visit, however, nothing remained on this spot but *débris* of what had been valuable antiquarian remains. Pieces of steatite urns, and portions of human and animal bones, lay in all directions. The rubbish thrown out in

* *Memoirs of the Anthropological Society of London*, vol. i, p. 299.

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digging the hole for the flagstaff contained, also, a quantity of broken bones and urns. We explored one side of the cairn, which remained apparently undisturbed, but found nothing of importance, and I soon became convinced that however interesting this spot had been, it was now quite destroyed, and useless for any purpose of throwing light upon the original objects of the structure. Leaving, therefore, the Muckle Heog, we examined the remains of a large cairn of stones at the foot of the hill called the Muckle Heog. In it we found the remains of three short kists and one long one, all of which had long since been rifled of their contents.

A few hundred yards distant, on the road towards a village called Haroldswick, are the remains of what was once a large stone cairn called "Harold's Grave." There now seems to be some doubt in the minds of the people of Unst as to which was Harold's grave, some putting it at the foot of the Muckle Heog, while others (and this is the more general belief) place it in the road from the Muckle Heog to Haroldswick. In Mr. Edmonstone's *History of Zetland*, p. 119, this Harold's grave is described as "the largest tumulus in the island." Now, however, only a little heap of stones remains to mark the spot. In the museum at Lerwick there are two beautiful bronze ornaments which, common report says, came from Harold's grave.

The remainder of my stay in Unst was devoted to travelling from place to place in search of further objects of interest, but wherever we went we found we had been anticipated. It is a remarkable fact that in the Island of Unst, large as is the number of cairns, scarcely any remain which have not been opened. At the top of nearly every hill we found distinct traces of stone cairns. We had, at the same time, the somewhat bitter satisfaction of hearing the details of the opening of each of these from the lips of a Mr. James Hay, a zealous local Wesleyan preacher, who had been more successful as a "revivalist" than (to judge by the results of his self-imposed labours) as a scientific investigator. For the last thirty years, Mr. Hay has been working on his own account, and during this time he has collected a large number of antiquities, which

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are now distributed he knows not where; some he sold to a "Swiss gentleman," others went "to a gentleman in England who is now dead." This is all we could learn from Mr. James Hay, who seemed perfectly astonished when he heard that we considered these relics of such importance as to come specially nearly a thousand miles to look for them, and he pleaded in justification of his vandalism, that "no one in the island cared about these things but himself, and that he had not got enough to pay for his labour." Mr. James Hay also told us that he had examined every relic in the Island of Unst, and in some of the neighbouring islands, but latterly his researches had been useless. If he now found a kist that had not been opened, it generally contained only some "greasy sort of ashes."

The second highest hill in the Zetland Islands is Saxiforth Hill, situated at the northern extremity of the Island of Unst. Here we found remains of a large stone cairn. On Scotties Wart there was evidence to show that two stone kists had been opened. The word *wart* is understood by the people to mean a peak or heap of stones, but Jamieson, in his *Dictionary*, says a "wart" means a mark. The origin of this word is interesting and important. We visited, for instance, the ruins of a very large stone cairn on a hill called the Galla Hill, or the Gallows Hill. In this cairn we found the remains of a human skeleton, with some limpet shells. A part of an under jaw is all that I thought it worth while to bring away. Report says, that a few years ago several skulls were taken from this cairn by Dr. Spence's sons, and that they had been subsequently replaced, but had either been again removed or entirely destroyed by the action of the elements.

Mr. Edmonston was greatly surprised to learn that the cairns on Saxiforth Hill and the Galla Hill had both been explored, as it was from these monuments that he anticipated the chief reward of our labours, by finding *in situ* skeletons and urns like those found on the Muckle Heog. In three days we had visited all the chief known antiquarian relics, but without any satisfactory results; for, as I before stated, in each case we found that we had been anticipated. On leaving London,

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I had expected that my stay in Zetland would be principally devoted to the Island of Unst, which had been reported to be so rich in relics of a bygone age. Before starting from England, I had remarked on the apparent anomaly of the most northern island of the Zetland group being so rich in relics of antiquity, and, from its isolated position, fully expected that we should be able to throw some little light on the history of the early inhabitants of this island. Had this really been the case, I had contemplated marking every spot of antiquarian interest on the map, and thus have completed an investigation of the archaic anthropology of this one out of the hundred islands which make up the Zetland group. On finding, however, that the island was really rather deficient than otherwise in pre-historic remains, I decided on quitting Unst, and visiting the southern part of the Zetland group, leaving Mr. Ralph Tate, however, to examine more thoroughly than we yet had done the ruins on the Muckle Heog, etc. I requested Mr. Tate to examine, on his way south, all the relics of antiquity of which he could hear anything, not so much to make explorations, as to be able to report on the antiquities of these northern islands. Mr. Tate's observations have been embodied in a separate report.

Although I consider the Island of Unst to be comparatively barren as to remains of any great antiquity, I must exclude from this remark a large fortified building in the hollow walls called Brochs, Broughs, or Burgs. I visited one similar on the Island of Balta, a small island, now uninhabited, lying close to the Island of Unst, where we also saw what were reputed to be the remains of a kirk, and with some probability, as this part of the island is called the "Kirk."

The largest and best preserved "broch" which I saw in the island was one situated on the west side of Unst, called the "Broch of Under-Houle." In the centre of this the workmen made a cutting to ascertain what the middle was filled up with, and the depth of the foundations. Amongst the black mould, alternating with layers of red ashes thrown out, we found a beach-rolled pebble, showing evidence of having been used at one end,—similar pebbles usually exist

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in large numbers in brochs; part of a stone trough was also dug out. This broch appeared to be of somewhat different construction to most of the others which I visited in Zetland, Orkney, or Caithness, and would, I think, be well worthy of excavation by anyone who has studied the general design of other brochs in the north of Great Britain. I did not, however, consider that the objects of my visit to Zetland would be materially furthered by examining into the peculiarities of the various brochs, and decided, therefore, not to include an examination of these interesting relics of antiquity in our investigations. I was influenced in coming to this decision by the fact that some of the brochs have been used in comparatively recent times; and we have an historical account of some of the brochs in Zetland having been inhabited as late as the twelfth century. In the whole of Unst, I could neither see nor hear of a single tumulus either of broken stones or of earth, and not even a "fairy knowe," or hillock. Stone cairns and stone kists, however, existed in comparatively large numbers.

At a spot running out into the sea, about a mile from Saxiforth Hill, called "The Urra," we saw a stone kist that had been opened by Mr. James Hay, but nothing remained in it. In this case, the kist was covered with earth. A cutting was also made into another hillock, but nothing found. At this spot there are traces of what might have been a fortified place,—a sort of natural broch, protected by a wall running down to the sea on the land side. There is no evidence whether these remains of a wall had been used for defensive or for agricultural purposes. The situation is one that would have been very likely to be chosen for defensive purposes, wanting only this wall to render it a very formidable defensive stronghold.

On the road from Batta Sound to Yew Sound, I observed several stone kists, two of which had been opened and excavated, and there were traces of others which had been removed.

With regard to the antiquity of the skulls found in the Muckle Heog, a fact came to my knowledge which deserves to be recorded, as a warning about coming to any conclusion on

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that point. The Principal of the University of Glasgow, the Rev. Dr. Barclay, who is a native of Zetland, told me he well remembered that, when a boy, he used to go on the Muckle Heog and had frequently taken out skulls from between the stones at this place, and had returned them again. This circumstance would seem to show that this spot had been disturbed before, and that it was not a sepulchral place of much consideration or design. This fact, too, indicates caution in coming to any conclusion that the skulls found were those of natives. The distance from the sea at this place is less than a mile; and although it is not probable that these were the remains of shipwrecked mariners, yet we have not sufficient evidence to show that these skulls are either those of natives, or that they are of any antiquity.

On leaving Wick for Zetland, I had the good fortune to meet Dr. Arthur Mitchell, who is so well known in Scotland as a most zealous and cautious antiquary; indeed, he is almost unrivalled in his personal acquaintance with the archaic anthropology of Scotland generally. Dr. Mitchell, in his official capacity as a Deputy Inspector of Asylums for Scotland, is continually travelling either in Scotland, the Hebrides, Orkneys, or the Zetland islands. It was with this gentleman that I returned from Unst to Lerwick. Immediately after arriving there, I crossed over to the Island of Brassay, and through the kindness and exertions of the Rev. Zachary Macaulay Hamilton, D.D. (the resident Church of Scotland minister), I was enabled to commence exploring a tumulus, which was situated about half a mile to the south of the manse, and about one hundred and fifty yards from the sea-beach. This tumulus was composed of broken stones, interspersed with layers of black earth and fragments of burnt pottery, and it also contained one bit of a steatite urn. It was covered in the grass and mould to the depth of about six inches. I desired the workmen to make a section of six feet, but it was found impossible to keep to this width from the continual falling in of the small angular stones of which the mound was almost entirely composed. I therefore decided to remove the whole tumulus; and as we approached the bottom,

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we came upon large stones apparently placed in connexion with some structure, but could not trace the design. At the bottom we found a stone about two feet eight inches high, eighteen inches wide, and eight inches thick, with a hole perforated in the upper part, of about ten inches in diameter.

This stone was standing erect, and a passage appeared to lead to it. Beyond this we expected to find a kist, but were disappointed. The probability is that this tumulus has been disturbed before, and part of it taken away.

In making these excavations I had the good fortune to be assisted by Mr. George Petrie, who is well known as a most careful observer and explorer, and who has enjoyed an experience of many years in the Orkney islands. It was in this tumulus that I found what I believe to be a new pattern of stone weapon,—at least new to this country,—for I saw none of a similar description in the Scottish Antiquarian Museum, nor in the British Museum. It is about eleven inches long, four wide, and one inch and a half thick, and has a distinctly marked handle, apparently prepared, like a millstone. (See next page, No. 1.) Small pieces of blackened pottery were continually found amongst the stones, and many of the stones, also, bore evident traces of the action of fire. It was the opinion of the workmen, and of all who saw them, that the whole had been composed of burnt stones. This appearance might be ascribed in part to the decomposition of the iron in the stone; but it is equally certain that they bore evident traces of fire.

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Some of my antiquarian friends to whom I have narrated the fact of these large tumuli being composed of burnt stones, have doubted the correctness of the observation, from its

No. 1.

No. 2.

No. 2 is a handle of a similar hammer as No. 1, and was thrown out with some of the other stones from the underground structure at Safester. (See *post*.)

being so exceptional a case to find tumuli thus composed. I have never heard any doubt expressed, however, by those who have examined these tumuli, and the matter can now be decided by the specimens of the stones produced, which will, I think, be sufficient to decide the question in the affirmative. In this observation, too, I am supported by Dr. Mitchell, who took some of the stones away for a closer inspection, and both he and the friends he has consulted agree in thinking that the stones have really been under the action of fire. Whatever may be the explanation of such a vast accumulation of burnt stones, there seems to be no room for doubt as to the fact itself. It was while engaged in excavating at this tumulus, that I heard a report of some coffins that had been found buried in peat in the neighbourhood, and it was

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on one of these coffins that I, in company with Mr. Petrie, discovered the inscribed stones on the table, a report of which I propose to give on another occasion. The discovery of these coffins and inscriptions raise special questions, and I have, therefore, embodied an account of both these points in separate papers.

When we had so far completed the removal of the tumulus as to be pretty sure that we should not find a kist, Dr. Hamilton kindly undertook to superintend the workmen while we visited other antiquities in the mainland. Before leaving, however, I went, in company with Dr. Hamilton and Mr. Petrie, to examine the broch of Burland at Brimster, and the most remarkable and perfect broch in Europe, which is situated on the Island of Mousa. The account of this broch having been inhabited is taken from the *Scandinavian Sagas*, and is to the effect that, during the reign of Harold Harfager, in the tenth century, the Viking Björn Brynjulfson, flying from Norway with Thora Roaldsdatter, took refuge in Mousa, where they celebrated their marriage, and passed the winter. These statements are of the highest importance, as tending to show how recently these buildings have been in use.

This broch is in a good state of preservation, although the entrance has been somewhat spoiled by a restoration undertaken by the Society of Antiquaries of Scotland. It occupies a circular site of ground, about fifty feet in diameter, and is built of middle-sized stones well laid together without any cement. The height is forty-two feet, bulging out below, and tapering off towards the top, where it is again cast out from its lesser diameter, somewhat resembling a dicebox, with the object, as is supposed, of preventing its being scaled from without. The doorway is so low and narrow as only to admit one person at a time, who has to creep along a passage fifteen feet deep ere he attains the interior open area.

The structure is hollow, consisting of two walls, each about five feet thick, with a passage or winding staircase between them of similar size, and enclosing within an open court, about twenty feet in diameter. Near the top of the building, and opposite the entrance, three or four vertical rows of holes

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are seen, resembling the holes of a pigeon-house, and varying from eight to eighteen in number. These, it is supposed, admitted air and a feeble degree of light to the chambers or galleries within, which wound round the roof of the building, and to which the passage from the entrance conducts; the roof of one chamber being the floor of that above it.

Excavations are about to be resumed of interesting remains of a broch near Lerwick, called the Burg of Clickomin. Some years ago, through the zeal of Mr. Smith, the sheriff's clerk of Zetland, this broch was partly excavated, and in places restored. When these excavations are complete, this brough will be of the greatest interest to all lovers of antiquities visiting the Zetland Islands. I was sorry to observe the small care which the inhabitants of Lerwick had for this interesting relic; and was informed that some of these enlightened people amuse themselves by mounting the hollow walls and throwing down the stones from the top. When there, I saw the fireplace in the middle had been recently broken by one of these Goths.

One of the most interesting facts in relation to these brochs is that for many years they were supposed to be of Scandinavian origin, but when seen by the northern antiquaries they were at once pronounced of Celtic origin. M. Worsaae emphatically says,* "they have no resemblance to the old fortresses in the Scandinavian north." Captain Thomas is engaged in working out the interesting question of the distribution of these brochs, and it is probable that his researches may throw much light on the archaic anthropology of this part of Europe.

Having thus completed a survey of the objects of antiquity in the immediate vicinity of Lerwick, I accepted an invitation from Andrew Umfray, Esq., of Reaywick, to visit, in company with Mr. Petrie and Mr. Smith, some remains on his property at Westerskeld, about two miles from his residence. Workmen were provided for us by Mr. Umfray, superintended by an intelligent Highlander from Aberdeen. We cut a trench

* Worsaae's *Danes and Northmen*, p. 233.

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with a tumulus at this place; it was composed of exactly the same material as the one at Brassay. Just at the outside we found the remains of what the people said had been a well, and always filled with water, until Mr. Umfray cut a deep trench in the neighbourhood to drain a small loch, since which time it has been dry. This cavity was situated on the south-west side of the barrow. The sides and ends were formed with rude undressed blocks of stone, and the bottom was also paved. It was five feet long at the bottom, and four inches longer at the mouth. The width was one foot ten inches at the widest part, and one foot four inches at the narrowest. A portion of the roofing, or covering, remained at the north-east end, and was placed slantingly. The height of the interior to the highest point of the roof was three feet eight inches. This tumulus was known to the residents in the neighbourhood as "The Fairy Knowe," a name given alike to artificial and to natural mounds. We visited two "Fairy Knowes" in the side of the hill, near the turn in the road from Reaywick to Safester, and found that these wonderful relics were merely natural formations. The workmen were soon convinced of this, and our digging had the effect of proving to them that the fairies had nothing to do with at least two of these hillocks.

We next visited what is, perhaps, the largest tumulus in the Zetland Islands, distant about eight miles north from Reaywick, *i. e.*, at Safester, in the parish of Sandsting and Aithsting. The Rev. John Bryden, who was the former minister of this parish, and who wrote an account of these parishes in the *Statistical Account of Zetland*, published in 1841, says, p. 112, "In several parts of the parish there are the remains of several barrows or tumuli, probably of Scandinavian origin, some of which I have opened, but I could not congratulate myself on my researches, they having been opened before. In some I have found bones partly consumed by fire, pieces of charred wood, and parts of the urn in which the bones had been deposited. The urns appeared to have been roughly wrought out of a coarse sandstone, and others out of a soft stone called *kleber*. In some cases there is every

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reason to believe that the body had been burned at the spot where the ashes had been collected, and placed in the urn; because the stones which were found to surround the urn, over which the tumulus was raised, had been subjected to the action of a strong fire.

"In other cases, the urns have been placed on a dry piece of ground, covered with a flat stone, and a little earth thrown over them. Of this latter description, I have one in my possession, which I found under the foundation of the glebe dyke. It measures twelve inches over the mouth, ten inches over the bottom, and is ten inches deep. It contained a quantity of half-burnt bones, and was covered with a pretty heavy stone, flat on the side next to the urn; unfortunately, it was partly broken before I discovered it. There is, however, enough remaining to show its shape and workmanship. I have discovered two other urns on the glebe, filled with a black unctuous earth, but so much decayed that no part of them could be lifted. Out of one of them I removed the earth, and found lying at right angles in the bottom four pieces of broken stone axes."

It will be seen that Mr. Bryden speaks of the urns which he found as having been "roughly wrought out of coarse sandstone, and others out of a soft stone called *kleber*." Now, these statements are important. The discoveries at the Muckle Heog and in the Island of Yell of steatite urns, would naturally lead one to suppose that similar urns would be found in other parts of the islands. In removing the Brassay tumulus, and in exposing the Safester tumulus, I found several pieces of urns which looked like pieces of rude pottery. These specimens were supposed to be bits of steatite which had been decomposed under the action of fire. From the specimens produced, it will be seen that it is heavier than the usual British pottery, and that it contains bits of mica. It is supposed by my colleague, Mr. Ralph Tate, to have been made from steatite when in a soft state. There seems, however, no reason to doubt that it is really pottery; although it differs in structure very considerably from a bit of pottery I found in connexion with a cromlech-like structure in another

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place, and which I shall presently describe. My friend Mr. Charles Warne, F.S.A., who is no mean authority on British pottery, writes to me, that he cannot understand how a doubt could ever have been entertained of these specimens being genuine pottery, although he acknowledges them to be heavier than any specimens of British pottery known to him.

Mr. Bryden, whose remarks we are now considering, is dead, but he is well remembered in Zetland for the zeal with which he made explorations; and it is reported that he collected a large number of urns and stone implements, some of which, I learnt, he sent to the Copenhagen Museum. The fact that Mr. Bryden found he had been anticipated in the opening of these barrows, is also somewhat significant, and not altogether encouraging to the future explorer. I heard reports of tumuli which had not been touched; but all I saw bore traces of having been examined. The tumulus of Safester bore evident traces of having been partially examined, although it is, I believe, far more perfect than the one at West Skeld; and from an examination of this tumulus, it became pretty clear that the building, or kist, which we saw at West Skeld, had been exposed by the removal of a large part of the tumulus. This tumulus had probably been conical, about ninety feet at the base, and about twelve feet high, if not much higher. A portion of the centre had been carried away, and we saw a cottage which had been built with the stones taken from it. It was reported that the man who was doing this was compelled to cease on account of the superstitious feeling of his wife, that some evil would come to the family; but the man himself told me that he did not go on taking the stones, because he found that he had such difficulty in doing so, the small stones continually falling in, and thus preventing him getting at the large ones; in fact, that the labour was too great for the result. The former story is generally believed to be the true one; but I see no objection to the second.

Just outside the base of this tumulus, on the north side, is a well, about two feet six inches deep, two feet long, and one foot six inches wide. It was filled with water and green weed, but appeared to be made much in the same way as an ordinary

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short kist. It is certainly now used as a well, and I am inclined to think was intended for this purpose. Mr. Petrie, however, thinks that because it was floored it was not originally a well, and instances the kist we examined at West Skeld, which, although used recently as a well, was evidently not originally intended for that purpose. In this instance, the kist was on the south-west side. I have before stated, however, that I believe the so-called well at West Skeld to have originally been in the centre of the tumulus; even now it is partially covered. There was certainly an irregularity of form about this kist; but Mr. Petrie quite agrees with me in thinking it to have been a kist, and we only differ as to the original use of the well, which is at present, and apparently has always been, quite on the outside of the Safester tumulus.

Before we had completed the excavation here, Mr. Petrie was obliged to return to Orkney, and this I regret, as I should much have liked his opinion on a very curious structure which we came to at about nineteen feet from the outer edge of the north-north-west side. Here we came on a structure described by the workmen as "like two chimneys." The outside entrance was two feet seven inches wide, and the walls continued on each side for seven feet six inches, gradually narrowing to about thirteen or fourteen inches. The following is a sketch of the ground-plan:—

At *x*, *x*, the wall appeared to be covered with soot, and pearlash was abundant. Dr. Mitchell says, "At first sight, I thought the structure looked like a portion of a beehive chamber or chambers, but the second wall B so close to A, and with the curve in, renders this unfeasible."

I have mentioned, that before we commenced digging at this tumulus it was seen that the one side of the tumulus was flattened and depressed. Dr. Mitchell says that nearly all the

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tumuli in Zetland have this appearance. This fact has hitherto been accepted as evidence that these tumuli have already been explored. This supposition is further confirmed by the fact that Mr. Bryden and others have confessed to having partly examined a large number, but, in their own words, "found nothing to repay their trouble." The discovery of this structure within the tumulus opens up the question as to whether the depression seen on the Zetland tumuli may not be the result of the falling in or ruin of the building, rather than that of the usually accepted hypothesis. Dr. Mitchell thinks there is "good reason to believe that a chamber existed in every one of them;" but this point cannot be decided without further most careful and patient research. What have hitherto been thought to be rude blocks of stone piled together, may prove the ruins of a similar structure to that found at Safester. The material of which this tumulus was composed varied in no way materially from that opened at Brassay and West Skeld, or from those described by Mr. Bryden. Several pieces of rude pottery were thrown out with the broken stones, specimens of which are now produced.

I had contemplated removing the whole of this tumulus, so as to be able to discover, if possible, whether there was any design in connexion with the large blocks of stone continually found. I conversed with the intelligent foreman of Mr. Umfray's workmen, and asked, in how many days he would be able to remove this tumulus, working with twelve men every day. He took some little time to make his calculation, and informed me that he thought it could be done with twelve men in about five weeks, but he could not say to a week either way. This fact will give some persons a better idea of the size of this tumulus than any section. Whoever had opened this tumulus had apparently been dismayed at the amount of work, and had left off after taking off the top layer of stones. This, however, unfortunately prevented us from ascertaining how the top had been closed, but it had all the appearance of having been gradually brought together in rude irregular pieces of stone, in much the same manner as that seen at West Skeld.

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Having laid bare this structure, and ascertained that there was another building near the middle of the tumulus, I left it, with a hope that the people of the neighbourhood would do what they could to prevent the structure I have described from being destroyed. This tumulus was also called a "fairy-knowe" by the inhabitants, and the women were not at all pleased with our work. They said it was all very well for us to come there in the summer time, when the nights were light, "but what will become of us poor people in the winter." It was impossible to make them understand the object of our digging; and to all explanation they would simply reply, that they thought "we had far better leave these 'fairy-knowes' alone, and that touching them would do us no good, and be merely sure to injure them." We could not get them to believe that the manners and customs of the people who raised these monuments was any business of ours, although we assured them that we had been specially created for that purpose.

In company with Mr. Umfray, of Reaywick, and Mr. Johnson, of Hestensetter, I examined what is known as the "Giant's Grave." It is situated on the latter gentleman's property on the top of the hill of Hestensetter. With very great difficulty we removed a large cap stone, which had defied the efforts of all who had before attempted it. I learnt from Mr. Johnston that it was the custom for the young men of the place to assemble on this spot and attempt to remove this stone, and after some considerable effort, they had succeeded in throwing the top stone from the position in which it had been placed. We were somewhat surprised at finding pieces of wood within this chamber, but this explanation sufficiently accounted for their presence. The top stone measured five feet ten inches by four feet ten inches; the entrance, one foot seven inches; the interior averaged about five feet ten inches wide, and about the same distance long. It was of a semi-octagonal irregular shape, composed of six stones. It was here I found the large rough stone, and the fragments of pottery and calcined bones, which I now produce. This structure had many of the characters of a cromlech; and it is worthy

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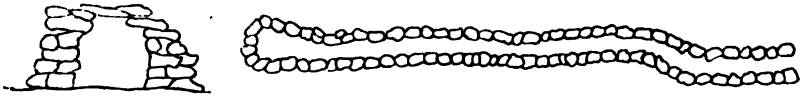
of note that the pottery here found essentially differs from any found elsewhere; the only bit preserved had the string pattern on it.

At East Skeld, I saw structures which appeared to be similar to this building. At this place, these remains are called "Pights or Picts' houses." Mr. Umfray surmises that they were originally "pights or dwarfs' houses." Dwarfs, in this locality, are still called *pechts*. The whole of this district is rich in remains, which, I think, are well worth further exploration. The implement now produced was found in the parish of Walls, and brought to Mr. Umfray while I was there, who kindly presented it to me. This was apparently used as a sling-stone. I am informed that the Rev. W. C. Lukis, F.A.S.L., has seen many similar specimens in Guernsey and the adjacent islands. A similar one was found a few years since near Reaywick House, imbedded in the peat. This specimen was also extracted from the peat.

I now have to record the most interesting and important part of my labours, which resulted in the finding of the large number of worked stones now produced. While working at the tumulus at Safester, we heard that a long underground gallery had been opened about one hundred and fifty yards from the tumulus. It was reported that it had been partly opened by the late Mr. Bryden, and that he had found in it some stone implements. This was about thirty years ago; and although the place was not fifteen yards from some cottages, we had some difficulty in finding this so-called gallery. Mr. Smith, however, offered a reward to the workmen, and this had the desired effect very shortly afterwards. Most likely the position was well known, but the people believe that this gallery led to the so-called "Fairy-knowe," or tumulus, which we were



opening. We explored the whole of this underground structure. It was rather more than fifteen yards long. The pas-

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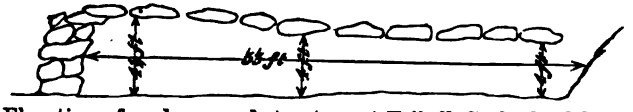
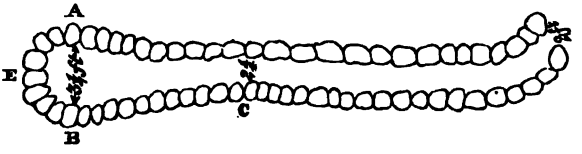
sage varies in width from sixteen to nineteen inches. At one end there is an expansion, which is squarish, and at its widest two feet and a half. This expansion continues more or less over four feet of the length of the passage. The sides are perpendicular, having no tendency to meet at the top. They vary in height from two feet to two feet and a half. The lintels are large and flat, but differ greatly in size and shape. I had never seen anything at all like this, and considered myself fortunate in getting the opinion of Dr. Arthur Mitchell, who had had experience in opening these structures in Scotland. Dr. Mitchell gave me the following opinion:—"At first sight," he says, "this structure looked like a large drain, but that it was not so is rendered more than probable, first, by its size, which is too great for a drain; and secondly, by the fact that the floor was not level, but rose and fell again at one or two places, where the rock was reached. It is ruder and less substantial than any underground structure in Scotland which has ever been described. Its dimensions, too, are smaller, being *lower* and *narrower*. Of all the underground structures which have been described, the nearest to this at Safester is the one at Eriboll, in Sutherlandshire. It (the latter) is in a state of very good preservation, is narrow and long, and shows a trifling expansion at the end. It was described to the Society of Antiquaries



Elevation of underground structure at Eriboll, Sutherlandshire.



Ground-Plan of ditto.

in May or June last. In the district of Scotland where it occurs, such structures are called 'Hiding-places,' this being,

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of course, a translation from Gaelic. In other parts of Scotland they are called 'Eirde Houses.'

"Some of those I have seen appear to have been, or at least may have been, underground to an overground structure; but the position of others makes this idea improbable, if not impossible. Nor is it likely that they were all built for the same purpose or at the same epoch. They all exhibit many points in common,—the style is the same,—they resemble each other, but they also differ from each other in important respects. Going from rudeness towards perfection, I should go from Safester to Eriboll, and from that to Buchaam, and from that to Glenkindie. Of these, none will be found so puzzling as that at Safester."

I have little to add to the above observations. Mr. Petrie was obliged to leave before the exploration was completed, and I did not therefore get the advantage of his opinion. I heard of similar structures in other parts of Zetland, and they are all well worthy of complete and careful exploration. Some of the lintel stones which covered this building were very large, and at the previous opening had been thrown down, and were taken up by us with great difficulty. The whole length was filled in with stones and earth, and only a few of the cap stones remained in their original position. Whilst the rubbish was being thrown out, a piece of one of the implements now exhibited was brought to me by Mr. Smith to ask if it was worked, and I at once repaired to the spot, and both Mr. Petrie and myself were alive to the importance of this discovery, and in a few minutes we collected several fragments of these implements. I put the pieces together, summoned all the children in the little village, and made them collect all stones of a similar description, not only from the mould thrown out, but about the fields in the neighbourhood. By night we had collected a goodly number, which we at once got transported to our host's house at Reaywick, and travelled all the night with them to Lerwick. Here we exhibited them, in the hope of hearing of similar implements in other parts of the island. The next day, Mr. Petrie returned to Orkney, Mr. Smith remained at Lerwick, and I again returned to conclude

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the exploration. For several days I continued to employ men, women, and children, in looking for these implements, and the result was I collected the implements now exhibited. I thought it advisable to bring away as many as possible, so that should no more be found there, they might be properly distributed. All I left in Zetland was one of each of the chief patterns with Mr. Umfray, who has already an interesting little collection of implements. Mr. Umfray takes great interest in this question, and did much good by exhibiting these worked stones to his *employés* and others. I fully contemplate that his efforts will result in the finding of similar implements in other parts of Zetland. What gives an additional interest to this discovery, is the fact that this underground building was excavated by a local antiquary, of no small attainments, some few years ago, but that these implements were passed by and not detected to be works of art. Mr. Bryden was made a corresponding member of the Society of Northern Antiquaries for his zeal, and he wrote an interesting account of the Zetland stone implements in the statistical account to which I have referred. It becomes of much consequence to know what Mr. Bryden considers as implements, and I therefore quote his description entire, as it helps to show the class of antiquities which had, up to that time, been found in Zetland. After quoting Dr. Hibbert on the use of stone implements by the Teutonic tribes in the eighth century, he goes on to say,—

"These extracts, from a composition of so remote a date as the eighth century, may be considered as illustrative of the general modes of warfare adopted at that time by the Saxon and Scandinavian tribes of Europe, among whom a greater similarity of language and manners then prevailed than was to be found at a later period. The first of the offensive arms of the Teutons, of the eighth century, was the battleaxe. It appears that these axes were constructed of stone. The heroes of the Teutonic romance are said to have thrust together resounding stone axes,—these weapons being expressed in the original by the term *Staimbort*, from *stein*, a stone, and *barte* or *barde*, an axe. In Shetland, numbers of stone axes have been discovered, which are wrought from a remarkably com-

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pact green porphyry, probably derived from Scandinavia. In a note the Doctor remarks, 'the stone contains, along with quartz, a considerable portion of felspar in its composition, and probably some little magnesian earth; it resembles a rock that I have seen associated with serpentine, as well as a substance that is used in the construction of some of the hatchets of the South Sea Islands.' In form, the Shetland *steinbarte*, or stone axe, is of two varieties,—it is either single or double edged.

"*Single-edged Steinbarte.*—This variety has one cutting edge, generally of a semilunar outline, and tapering from opposite ends to a blunted extremity or heel. In some specimens both sides are convex; in others, one side only, the other being flattened. All the edges, except the broad sharpened margin, are bluntly rounded off. The single-edged stone axes of Shetland vary much in their dimensions, being from four to eight or ten inches in length, their breadth proportionally differing. When the Shetland steinbarte was used in war, its blunt tapering extremity may be supposed to have been introduced within the perforation made into some wooden or bone haft, and afterwards secured by overlapping cords, formed of thongs of leather, or of the entrails of some animal, twine of hemp not being then in use. Another kind of steinbarte has been said to occur in Shetland, the sharp end of which describes the segment of a circle, whilst the chord of the outline is thickened, like the back of a knife. Probably its blunt edge was fixed within the groove of a wooden or bone handle, so as to form a single-edged cutting instrument.

"*Double-edged Steinbarte.*—The blade of this instrument is a stone, completely flattened on each of its sides, and not more than a tenth of an inch thick; it is of an oblong shape, having one blunted margin perfectly straight; and when the stone is held in such a position that the dull edge is uppermost, we have the form of a blade presented in which the two narrow edges are irregularly rounded off at their angles, so that one edge is much broader than the other. Every part of the margin, but that which constitutes the summit of the outline, is sharpened, by which means there is a great addition

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made to the extent of the cutting edge. The blade is five inches and a half long, and from three to four broad. Mallet, in his *History of Denmark*, describes a battleaxe of two edges as used by the ancient Scandinavians, and he adds, that when it was affixed to a long pole, it constituted a halbert. In reference to this observation, I have supposed a long staff with the extremity so penetrated, at one or two inches from the summit, as to form a long groove four inches in length, through which the stone blade, with the blunt side kept uppermost, must be drawn half way, and then secured to its station by means of cross ligatures. The whole would then present the form of a two-edged battleaxe. Antiquaries have remarked that this weapon was probably in use from the earliest period; but since it was in the course of time wielded by the trabants, or those who stood upon guard in the castles of their kings, it was named a *halbert*, from the Teutonic *hale*, a court, and *barde*, an axe. In the true spirit of archæological reasoning, it may be pronounced that the blade of this variety of the Shetland steinbarte, and the hypothetical handle to which it is fastened, constitute the rude form of the northern halbert.

"The blades of steinbartes are very abundantly found in Shetland. Not unfrequently several of them are discovered buried together, thus indicating a little armoury from which a number of weapons might be distributed, on an emergency, by the hand of some chief to a small band of natives met together on alarm of common danger. Assemblages of these weapons have been found in the parishes of Walls, of Delting, and in the Island of Unst. 'In Northmavine,' says Mr. Low, of Orkney, 'seven were discovered underground, disposed in a circular arrangement, with the points of each directed towards the centre of the ring. It is a pity that the number of these weapons was not nine, corresponding to the nine wounds of a lance in the form of a circle, which the deified Scandinavian hero gave himself when, by an act of suicide, he showed an example of death to his surrounding followers. At any rate, the circular arrangement of the weapons remains indicative of a mystical allusion, and that is quite sufficient to provoke an antiquarian inference.'

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"Regarding the people by whom these stone axes were used, the natives of Shetland have not the least tradition, and this circumstance is proof of their great antiquity. They are supposed to have dropt from the clouds, endowed with the power of protecting the houses in which they are preserved from the effects of thunder; hence they are commonly named 'thunderbolts,' etc. Some of these stone axes, as Dr. Hibbert observes, are of green porphyry; but I have seen some of them formed out of a remarkably compact grey-coloured stone, and even the green porphyry in some of them, from a particular chemical action to which they have been exposed, have in a great measure lost their distinguishing tint, and become of a whitish-grey colour. I have specimens of the stone axe of various dimensions, from five inches and a half to six, eight, ten, and fifteen inches in length. The cutting edge of the smallest is two inches, and of the largest, three inches and a quarter broad, and they gradually taper to a point at the opposite extremity. All the specimens in my possession are convex on both sides, but more so on the one side than on the other.

"I have some steinbartes of an oval figure, and others of a heart shape, with the apex considerably shortened; both formed of the two kinds of stones above-mentioned. The largest of the oval ones is eight inches and a quarter long, and four inches deep. The cutting-edge extends to two-thirds of its circumference, and the remaining third is rounded off, apparently for the purpose of holding in the hand. The heart-shaped one has a cutting-edge in every part. I have one different in shape from either of these two; it describes almost a semicircle on the one end, and draws towards a point at the other. The semicircle, and as far as the point, have cutting edges; the back is half an inch thick, nearly straight, and rounded off. Several stone axes, on removing the surface of the ground, were found lying together, a short time ago, within the dykes of Stenadale.

"It has been maintained, that the larger steinbartes were used as warlike weapons. This may have been the case; but that they were inserted in a haft or handle appears to me very

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doubtful. From their tapering shape, nothing could have secured them in such a position; and having no neck which the handle might grasp, the act of lifting it to give a blow would even be sufficient to cause it to slip from its place.

"Neither is any proof to be deduced from the appearance of the thin and broad-shaped steinbartes that they were ever used as halberts. To have rendered them efficient as a weapon of war, not only must the haft have been grooved, but there ought also to have been a corresponding groove in the steinbarte to retain it in its place, something after the manner of dovetailing in wood. As there are no marks indicating this to be the case, the steinbarte ought to have been perforated that it might have been firmly secured in the groove of the handle.

"The larger steinbarte may have been used both as a defensive and offensive weapon, either by throwing it from the hand, or striking with it when the combatants came to close quarters; and the smaller steinbarte, it is probable, was formerly used for domestic purposes, and held a similar place in the eighth or ninth century which a knife does in the nineteenth. That they are a very ancient instrument is without doubt; for even tradition itself is silent, both as to the time when, and the people by whom they were used."

I now exhibit specimens of the weapons here described. The three "knives" produced were found on the side of a standing stone near West Skeld. I was informed that six were found in a row, but that the other three were lost. The large specimen of celt, of beautiful finish, was given to me by the Rev. Dr. Hamilton. It was brought to him when I was excavating the tumulus in Brassay Island. A knife, like the one above described, was brought to Dr. Hamilton at the same time, and with his accustomed liberality he presented this, through Dr. Mitchell, to the Scottish Antiquarian Museum.

The Rev. W. Stevenson, writing in 1841, says in his account* of the parish of Northmaving, "Ancient arms have been found several times. A few of the people are in pos-

* *Statistical Account*, p. 75.

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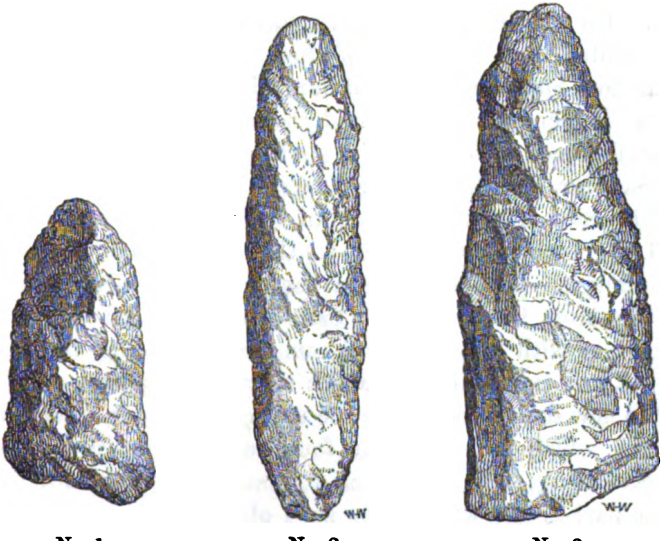
session of the ancient battleaxe, which is carefully concealed in some parts of the house, and superstitiously preserved, and is commonly called a 'thunderbolt.'" He says that he obtained one of a parishioner as a great favour. "It is," he adds, "quite entire, and composed of a very hard grey stone,—such a species of stone as is not to be found in this part of the country."

From the above description we see what were, at this time, understood to be stone implements in Zetland. Indeed, had I not been acquainted with the implements from the drift, I should have hesitated considerably before acknowledging these stones as having been worked by man; but under actual circumstances, I have no hesitation in doing so. The only implement of a similar description, and which is in the Edinburgh Antiquarian Museum, was one found, in 1850, in Orkney, by Mr. George Petrie, and is now classed with the polished celts from the same locality. It is labelled "A. S. 1,



No. 1. No. 2. No. 3.

Stone celt, found in a grave under a tumulus, parish of St. Andrew's, Orkney. Presented by G. Petrie, Esq., 1850." Mr. Petrie was therefore able to pronounce them to be imple-

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ments, and Mr. Smith readily accepted our conclusion. On showing these implements, however, to Dr. Mitchell and others, their opinions were (somewhat naturally) received with a considerable amount of scepticism.

On my return to Safester, I had the good fortune to find many more than those at first exhibited, and the whole of this series can now be examined, and classed according to their different patterns.

The scepticism of Dr. Arthur Mitchell was effectually removed during the next few days. Dr. Mitchell is most zealous as a collector of antiquities on behalf of the Scottish Museum, and he never loses a chance of adding to their treasures. I had heard that a Mr. Johnston, of Trester, had found a large number of celts, and had decided on going to examine them; but the day before I had intended to go, I met Dr. Mitchell on his way from inspecting the tumulus and underground structure at Safester. He told me that he had been to Mr. Johnston's, and that this gentleman had only one polished celt left. He had discovered twelve, but all except one had been distributed, and no traces of them could be heard of. Mr. Johnston, however, informed him that near the place where these implements were found, there were also to be seen several stones turned out of a similar structure to that found at Safester. Dr. Mitchell at once repaired there, and found eighty rude implements, half of which he presented to me, and the remainder he sent to the Antiquarian Museum at Edinburgh. It will be seen that the implements differ in pattern from those found at Safester. Dr. Mitchell has supplied me with the following remarks respecting the instruments, and the position in which they were found:—

"A few days after seeing the collection of rude stone implements, which Dr. Hunt had found at Safester, in the parish of Sandsting, I had occasion to pass West Houland, in the same parish, and when doing so, I observed at my feet what I took to be one of the same style of implements. On examination, it proved to be one, and knowing that Dr. Hunt had found so many at one place, I looked around for others. In less than fifteen minutes, I had a couple of dozen. I then

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called at the cottage adjoining, and there found a considerable number, some of which were more than usually perfect. These were added to my own find, and to those again some others which the cottagers afterwards picked up, making in all about eighty, of which the half was given to Dr. Hunt.

"On inquiry, I found that at the spot where they were found, there had existed an underground structure like that at Safester. It had been found and destroyed in improving the land, and the implements I fell on were in the rubbish which had been thrown out. At the time of the turning up of this structure, many perfect and carefully polished celts are said to have been found. A like thing is also said of Safester.

"I call them 'implements,' but I have no theory as to their use. I merely find the word convenient."

It will thus be seen that several new patterns of implements were found. All the polished stones were more or less prized by the Zetlanders, and generally kept with care from some superstitious feeling.

They were all, however, quite surprised to hear that I thought the ruder stones of any interest. "Why," they said, "they are only bits of stone." They never dreamt that these stones had been made by man. They soon became aware, however, that there were certain conditions which these stones must all fulfil before they could be considered worthy of being taken away. Hundreds of pieces of stone were brought to me, which I declined, whilst I am fully conscious some of these I now exhibit are not finished implements, but appear to be in process of formation. There are also some others which cannot be determined with any great certainty to have been really worked by man.

Dr. Mitchell is pleased to say that the find of these worked stones is "the discovery" of my visit. I cannot but think it must be gratifying to the society to know that the first exploration which they have undertaken has yielded such interesting results. The finding of these worked stones opens up valuable questions in connection with the whole subject of the so-called stone age. Here we find a large number of very rude worked stones, but nothing at all to indicate their age. There is not

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a vestige of any tradition about them, and indeed they had never until my visit been recognised as the works of man. Three questions then await our solution :—

1. Who worked these stones ?
2. When were they manufactured ?
3. For what object or purpose were they made ?

No definite answer can, at present, be given to either of these questions.

On the first two questions we have not even the materials for speculation ; but we may all form our own hypotheses respecting the object or purpose for which these stones were worked.

I might, however, have passed over this point, after according the fullest permission to each of our fellows to form his own hypothesis, but for the recent discussion before the Anthropological Society of Paris on some very similar worked flints from Pressigny-le-Grand. The discovery of these worked stones in Zetland, I cannot but think, somewhat helps us to discover the uses of the flints found in France. Now, it is not likely that objects so similar in form as these could have entirely different purposes or uses. This being granted, we shall see that the recent finds in Zetland, will, at least, have the merit of destroying one of the hypotheses brought forward respecting the uses of the flints found at Pressigny-le-Grand.

This subject is both so important and interesting, that I make no apology for giving at length the discussion before our sister society on a very similar discovery.

At a meeting of the Society, in August of last year, Mr. Broca, the Secretary-General, placed upon the table the worked flints sent by M. Meillet, of Poitiers, found in the beds of Pressigny-le-Grand. These objects, eight in number, very much resembled each other. The general form is that of a thick elongated irregular wedge, cut facet-wise by percussion. The small end, though not pointed, terminates in an angular summit. Although these flints had previously been called hatchets, they differ by their dimensions and form entirely from the worked flints hitherto examined. One of them is 303 millimeters long, 115 millimeters wide, and about 80 millimeters thick at the large end. Some were 40 centimeters

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long. These large and heavy flints were found in considerable numbers upon the surface of the soil, and the superficial layers of the vegetable earth, in an extended district.

Near these large flint blocks were found knives of considerable dimensions, and many shapeless chippings, indicating that the place was a manufactory for working flints. M. Broca says that M. Meillet speaks in his letter of a large stone resembling the polishing stones found elsewhere in ancient manufactures of flint implements.

M. Leguay added some particulars to those given by M. Broca, relative to the recent finds at Pressigny-le-Grand, having received some communications from M. Brouillet, who with M. Meillet first explored these beds. He offered the Society ten flints from these beds sent to him by M. Brouillet. These formed a nearly complete specimen of the products of this station, or rather of this workshop, which seems interesting, were it only for its extension. In fact, upon a surface of ground not less than 20 to 25 hectares, we find these flints from 10 to 70, and even 80 centimeters in thickness, and so abundant are they that M. Brouillet collected in his cart in less than an hour, such a number, that they weighed above 500 kilogrammes.

On this spot there evidently existed, he said, an immense manufactory of flints. He was, however, still in doubt whether these flints were destined for votive uses, or whether they were intended to serve as utensils, or weapons.

M. Brouillet had assured him that he possesses some 40 centimeters long. He had seen the two beautiful knives deposited in the Artillery Museum of Paris, which were some years since found in the Seine near the pont Napoleon III at Bercy. By a singular coincidence, these two knives are also of flint, as are most of the pieces found at Pressigny-le-Grand. He looked upon these large stones as being neither weapons (hatchets, tomahawks, etc.,) nor as intended for such. Those upon the table, as well as those he possessed, present all the same form, and what is more, the same process of cutting, but the stone, the nucleus is not full enough to admit a similar operation upon the other uncut surface. Under such conditions,

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it was impossible to obtain that ovoid or almond shape, which all other hatchets, whether of the diluvium or polished periods, possess.

The pieces he offered were flat, and do not seem to have been subject to any other process than of separation from the matrix. They cannot, consequently, be considered as implements, otherwise they would have been re-cut in order to give them the usual form.

As, therefore, he could not ascribe to them any other use, he was disposed to look upon them as votive objects. He was led to this opinion from having found some of them in sepulchres, smaller, but still presenting the same system of cutting as the stones of Pressigny. In these stones he recognised matrices or nuclei, the position of which in the sepulchre left no doubt as to their destination, and if this kind of Silex were not found in such abundance at Pressigny, he should attribute to it the same destination. But there is no trace found here of sepulchres; no bones, nor traces of pottery. He, therefore, would wait for further details before forming a definite opinion.

With regard to the smallest flints, he held them to be entire pieces. They presented a type which was continually met with either in caverns or in sepulchres of the stone period. But, just as the large stones of Pressigny are colossal compared with such of the same type as are found elsewhere, so are the latter larger than the flints found in grottoes or sepulchres; it is the similitude of type which made him undecided as regards their destination.

He ought, he said, to give no opinion relative to the age of these beds, but he did not think he would be much out if he asserted that they belong to the polished stone-age in the sense he understood this classification.* He felt no doubt upon this subject in the presence of the polished stone of which M. Broca has spoken. He added that this piece is sandstone. All the polishing stones found in different places are fine grained. He had himself found two such whetstones at Varenne-Sainte-Hilaire; and M. Rouyou has also found one at Villeneuve-Saint-Georges.

* See *Bulletins*, May 1864.

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M. Brouillet had written to him that he has not found a single polished flint. But if, as may be supposed, this bed is a workshop, there will, probably, be found some polished pieces.

M. Broca said that the hypothesis of M. Leguay seemed very improbable. Votive objects relate to some religion, and a religion is never limited to a small district of a few square kilometers. Again, how can we explain the accumulation of such an immense quantity of votive objects in a single locality? Is it to be supposed that this was a sacred spot where the peoples of surrounding districts came to perform certain religious ceremonies, and brought with them worked flints? Now, all these innumerable objects are perfectly alike both as to colour, and the nature of the silex. They all come from the same source, and everything concurs to prove that they have been cut on the spot where they are now found. Or, is it supposed that this spot was a manufactory whence the neighbouring peoples fetched their votive flints destined for religious ceremonies? Were such the case we ought frequently to find such flints in spots which were inhabited by such peoples, in their sepulchres, or around their altars. M. Leguay acknowledges himself that hitherto no objects resembling those of Pressigny have been found. It is, therefore, difficult to accept his hypothesis.

These flints can hardly have been intended for weapons, as they could not be held except on a large piece of wood evidently too heavy to handle. It is also very probable that all the types of weapons of the last stone period are known to us. We know also that the weapons of warriors were deposited in their graves; but, although all kinds of arms have been found in the sepulchres of that period, none were met with resembling the enormous flints of Pressigny-le-Grand.

The question then arises whether these objects were not implements destined for the cultivation of the soil. Several members of our Society have been struck with their irregular conic form, which might have served to till the ground, and used perhaps as ploughshares.

M. Gerard de Rialle here said the history of tillage is well known. The first ploughshares were made of wood; at a

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later period metal was employed; but nowhere do we find flint ploughshares used.

M. Broca contended that wooden ploughshares may turn ground of little consistency, but would be useless in tilling the soil of a forest. Effective tillage requires strong implements capable of turning up the stones, and cutting the roots. Archæology had established that the era of ploughing is signalised by the employment of metal shares. But the knowledge of agriculture and its benefits may have gradually spread among populations who did not possess a sufficient quantity of metal for this purpose; and it is conceivable that they may have had recourse to flint shares. This explains why this branch of industry had altogether a local character, and was of short duration, and why the manufactory at Pressigny was so extensive and productive. It is clear that the objects fabricated in such quantities must have been subservient to some general use. Thus the hypothesis of flint ploughshares he thought too conjectural to deserve a long discussion. He wished merely to show that it might be opposed to that of M. Leguay, which he looked upon as very improbable.

M. Leguay said in attributing to these flints a votive origin it was not his intention to assert, as M. Broca has understood it, that they were really so; nor had he denied that these places were manufactories, although hitherto no characteristic chippings were to my knowledge found there, which are always met with in places of this kind.

Votive stones are always found in sepulchres; and there are no sepulchres near these beds. All that he wished to say was that these stones might have been intended for a votive usage.

It is quite true that the pieces found elsewhere do not attain the size of these, but the dimensions vary according to the localities, and Pressigny-le-Grand possesses in its soil thick flints, from which large pieces were cut. Their abundance led to their being less estimated than in other less favoured spots. He could not see that these large pieces were implements, nor did he share the opinion of M. Giraldés, that they were used for agricultural purposes.

At these periods sticks were used to dig the soil, or perhaps

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stone hatchets, which, however, is not yet proved, and he asked how can a virgin soil be turned by these stone masses? Not only would the labour be considerable, but no man could work with such an instrument except for a few minutes. Besides this, the entire pieces are neither pointed nor trenchant, there are even some cut in squares at the two ends.

He did not look upon these pieces as weapons. They are not hatchets; their weight is opposed to such a use. Nevertheless, as they are found in such large quantities, and all cut in the same form, they must have served the same purpose. I venture to submit, after the objections he had listened to, an opinion which is shared by M. Brouillet, that these large masses are the matrices or nuclei from which knives have been detached. The stone, after having served its purpose, has been thrown aside as useless, for it is generally impossible to cut off a second knife, which would have been very small. M. Leguay then explained by means of the pieces on the table, the motives which have led him to adopt his opinion, as well as the means in which the knives have been detached in single laminæ, and why it was impossible to detach a second piece from these matrices.

He finished by remarking that the cut of the matrices of Pressigny-le-Grand differs entirely from the matrices hitherto found. The matrices of Pressigny could never yield more than a single knife detached in laminæ or by cleavage, whilst other matrices could furnish several knives.

In the latter the detachment of a knife was a preparation for ultimately detaching other knives, whilst those of Pressigny present only a single cut, and the edge in the back is formed by the detachment of a considerable number of flakes cut off in contrary directions.

This mark may enable us to recognise the knives of Pressigny, which may, perhaps, be met with at a distance from the place where they were produced, so as to distinguish by the mode in which they are cut. He had, however, found but few such in other localities.

At a subsequent meeting of the Society, the following letter was read from M. Meillet:—

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"The fields of Pressigny (there are twenty to twenty-five of them at distances from three to four leagues) are not sacred fields covered with votive arms. *They are workshops.* Upon the soil are found *all* the *débris* of flint cuttings, the nuclei, the knives, etc. The soil is encumbered with them at a thickness of seventy to eighty centimeters. I have found there flint hammers which served for the fabrication of these objects. The unwrought flints are found in prodigious quantities in these parts. They are flat pieces, ten to twenty centimeters thick, derived from the banks denuded of chalk. They are so common and so large in those parts, that I have seen ditches covered by a single piece of flat silex, to serve as a bridge. I have found in the fields of Pressigny five perfectly cut hatchets like those found in the dolmens; two of them were polished. Some amateurs of Pressigny possess a dozen of them, which have been found in a special field, where there are no nuclei. Some of the hatchets are admirably cut and polished, the large worked flints of which I have presented eight specimens, and which are found in large quantities, are neither hatchets nor weapons, but nuclei, from which knives have been detached. They are found in every stage of progress, according as there have been detached from them one, two, three, or more laminæ. There are some which have furnished knives on both their surfaces. By the side of the nuclei are found knives in abundance, splinters, and all sorts of rough objects thrown aside as imperfect. It is singular that the principal field where these *debris* are found, though situated in the open country far from towns and villages, is still called *Champ du Commerce.*

"These new sorts of Museums are not in a diluvian bed, but on the surface of the soil, or covered with a recent layer. I ascribe them to the third period of the stone age, which preceded the appearance of metal. There are in this locality well characterised diluvian beds, where there are found hatchets and arrowheads in abundance, but of different forms, and never polished.

"Some members of the Anthropological Society have suggested that the large nuclei may have served as ploughshares. I have examined and discussed that hypothesis with the mayor

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and the notary of that locality. It is, however, easily ascertained that these nuclei are only the remnants of flint blocks from which the knives have been detached. As many laminæ have been detached, as the nature and the quality of the flints permitted. Such as were of good quality furnished laminæ on both surfaces; these are very flat, and quite unfit for ploughshares. In other cases, three or four laminæ were removed from one surface of a flint, and the other side left untouched. Whilst some of these nuclei are elongated, and more or less cuneiform, there are many which are short and thick, and from which have been detached short laminæ for lance-heads. It results from all this that the nuclei are not cut for use, but are only the *débris* of the fabrication of worked flints."

At the sitting of the *Académie des Sciences* of April 3, M. Eugène Robert made the following assertions:—

1. With reference to Grand-Pressigny, the whole bed of so-called worked flints for hatchets, spears, knives, etc., is spurious. These flints were simply the residues from a manufactory of gun and pistol flints.

2. Subsidiarily, there lived in ancient Gaul, one race of men only, the Celts; a people who first entered Europe, and came probably from the great central table land of Asia.

At a sitting of the Paris Anthropological Society, on April 20th, M. de Mortillet made the following observations on Mr. Robert's views:—

"Both these assertions are founded in error. I shall not descant upon the second; it is sufficient to peruse the publications of our Society to perceive that it is unfounded.

"With regard to the first, which is more akin to my researches, you will permit me to offer a few observations.

"I must state at the outset, that according to his own confession, M. Robert speaks of a locality he has never visited; but he relies on the testimony of the actual President of the Academy, M. Decaisne. This fact renders the question more important, so that it deserves a closer examination."

The valley of the Claise, in which Grand-Pressigny and Abilly are situated, is enclosed by the slopes of high plateaux. The rocky frame of these plateaux is composed of chloritic

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chalk, surmounted by silicious clay, the whole being covered with a reddish vegetable earth of little thickness.

In the valley adjoining the slopes are found beds more or less regular, of old alluvium, rising ten to twelve meters above the level of the river. This the geologists call the diluvium or quaternary formation. Well, in this perfectly undisturbed diluvium were the worked flints found by MM. Brouillet, Lartet (sen.,) Christy Evans, Dr. Leveillé and Breton, at Grouillaire, by the Abbé Bourgeois, at la Glasire, and by myself, who was the first to describe the bed at Vivier. Surely, these flint implements found in quaternary formations are not the residue of the manufacture of gun flints.

We come now to the plateaux where these beds abound. A simple examination of the soil suffices to show that the worked flints, as well as the larger pieces called *livres de beurre*, and the small flakes, are spread upon the surface of the silicious clay, under the vegetable earth. This shows that they are anterior to any fabrication of gun flints.

But, says M. Decaisne, there are many found on the surface. Very true. The vegetable earth being very thin, the ploughshare brings frequently many to light. They are found in clearing the fields from stones, and they are heaped up along the hedges and the roads.

M. Decaisne adds, that the country-people assured him that formerly there arrived annually squads of workmen to collect the flints. They carried off such flakes as suited them, and left behind the heavy pieces.

Supposing even that flints were taken away from Grand-Pressigny to manufacture them into gun flints, would that militate against the old flint implements? Are those found in the diluvium less authentic for that? These large flints, called *livres de beurre*, lying under the vegetable earth, sometimes wedged in old walls, the cut of which has nothing in common with the shape of gun flints, and which have frequently been formed into weapons and implements,—are these large flints less important ante-historical objects?

I go further, and assure M. Decaisne that he has been led into error by the persons who furnished him with information

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on this subject. Inquiries have been made at Abilly and Grand-Pressigny by the *maires* of these communes—MM. Cartier and Breten—and they have been unable to ascertain that there is any tradition of the arrival of parties of workmen to collect the flints.

The fabrication of gun flints is under the military administration. Now, in the Archives of the Depôt of Artillery, containing all the reports and documents concerning this fabrication, Grand-Pressigny and the adjoining localities are not mentioned.

And this is easily explained; for the flints of Grand-Pressigny, of coarse composition, containing in the interior small grains, and which scale off by percussion, are useless for the fabrication of gun flints. For such a purpose is required flint of homogeneous structure, very fine, and which produces by percussion with steel numerous sparks, without much splintering.

Everything concurs to prove the pre-historical authenticity of the worked flints of Grand-Pressigny. We possess here the works of one of the ancient populations, which it is important for us to study in the relations of their mode of life.

M. Bricheteau then said, that as regards the flints of Grand-Pressigny, he had observed that towards the end of the last century gun flints were manufactured in the canton, where the bed is found of which M. de Mortillet has shown the specimen. He recollected having seen them about twenty years ago; moreover, the fact is notorious. There is a village which has become famous, namely, Nohant, actually called Nohant-le-Fusilier, which is worthy of note.

M. de Mortillet replied, Nohant is, he believes, called *Le Fuselier*, because formerly *fuseaux* (spindles) were there manufactured, and not gun flints. Despite these observations, he would still maintain that no person in that district has the least recollection of a manufactory of gun flints. Thrice had he instituted inquiries in these localities. Engineers, physicians, proprietors, have unanimously denied it. It seemed to him beyond all doubt that the flints of Grand-Pressigny have no analogy to gun flints.

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M. Leguay then said, I fully agree with M. de Mortillet. I have, like him, visited the localities, and have minutely studied all the elements of the question. One must not possess the least knowledge of the one process by which fire-stones are obtained to confound the latter with the knives of the stone period. Here we have before us the nucleus of a large flint of which the laminæ have been detached by a special process of breakage, which I have called *clivage*, and which has nothing in common with the break in fire-stones. We observe that this flint is thrown away when knives could no longer be detached from it. Finally, there are found in this region three polishing stones, indicating that the use of polished flint existed; and I am not aware that at the period of the manufacture of gun flints silex was still polished.

M. A. Sansen concluded this remarkable discussion by observing, that M. E. Robert was the first who contested the origin of the flints of Grand-Pressigny, and he seemed to possess a monopoly of contestations. He had already contested the authenticity of the marks of human industry found by M. Desnoyers in the reindeer bones found in the caverns. It seems that M. Robert has not been more fortunate in this instance than in the former."

I have entered thus at length into a subject apparently foreign to my Zetland investigations; but it will be seen that all this discussion has an important bearing on the object or uses of these worked stones. It will also be seen from the discussion before the Paris Society, that the conclusion which was arrived at, after hearing all the different theories, was, that "they were the remnants of flint blocks, from which the knives had been detached." But, although this explanation might be accepted as possible to the worked flints from Pressigny-le-Grand, it is not applicable to the worked stones of chloritic schist from Zetland.

The whole question, therefore, not only of the Pressigny-le-Grand worked flints, but of the object of these worked stones, is opened again. It is an important fact to remember that these worked stones have as yet only been found in two places in Zetland, and that only about two miles distance apart. In both localities there existed a similar underground struc-

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ture generally called "Erdie Houses," of which Dr. Simpson says there are very few south of the Forth.

I am at a loss to offer a really satisfactory explanation of the use of these worked stones. It will be seen that those from Safester are of very distinct patterns, while those from West Howling more resemble those of the flints found in Pressigny-le-Grand.

There is one worked stone which I picked up by the side of the footpath leading from the underground structure at Safester, to the tumulus at the same place. This is the only one of this pattern which I found, and it is highly valuable, as showing the same pattern as that found by Mr. Taylor, at Abushehr, in Arabia.

The following is a drawing of the two, quarter-size :—

No. 1.

No. 2.

No. 1. Stone picked up on the footpath at Safester. No. 2. Cast of Implement from Arabia.

It would be idle, in the present state of our knowledge, to advance any more theories respecting the uses of those worked stones. I am inclined to think that they were intended for no special purpose. They are of too many sizes and patterns to admit of such an hypothesis. I am also inclined to consider them as articles of daily use, and intended for different purposes, according to the shape and size. Neither of the explanations propounded with reference to the worked stones from Pressigny-le-Grand, will meet the requirements of the case of these Zetland stones. These are certainly not the "*débris* of

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the fabrication of worked flints," nor have "short laminæ been detached for lance heads." Nor do I suppose any one will assume that all these different shaped objects are symbols connected with some early religion. It is, I think, far more reasonable to suppose that at this place there existed a large stone implement manufactory, which turned out weapons for defence, and implements for breaking ice, tilling the ground, killing animals, cleaning skins, chopping vegetation, breaking shell fish, bruising meat, cutting wood, etc., etc. We may also fairly suppose that these stones were used before the polished stones, which have been found in considerable quantities in Zetland. We find polished stones of all sizes in Zetland, and although it was formerly supposed that all these were weapons of war, yet I think there is good evidence to suppose that they were far more intended as articles of daily and domestic use, in which defence, perhaps, formed an important part.

Neither am I disposed to think that these weapons are rare, and that we have lighted on the only manufactory in Zetland. The one result which I think may be adduced from this discovery of rude stone implements in Zetland is, that the classification proposed by the Northern Antiquaries of worked stones from the drift, and these polished stones, will not hold good. We must now make a second period for rude unpolished stones and flints unconnected with the drift.

This discovery in a great measure helps to supply a link in the chain of evidence which has long been known to be very deficient by all students of Archaic Anthropology.

It is after all a matter of surprise that there should be nothing connecting the rude flints from the drift with the polished "celts" so frequently found throughout all parts of Europe. Now, however, we have got the connecting link, for on none of these stones do we find a trace of polish. If we take mere rudeness as a sign of antiquity, we shall be obliged to make these worked stones of greater antiquity than those found in the drift. At present we have no evidence to fix any age to these Zetland implements. Whether the drift has been deposited as the flints of Amiens since these implements were

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worked, is a question which I cannot solve. All I can affirm is, that they were found on the surface of the ground, and in connexion with an underground structure. It is right also to add that during the whole of my diggings in Zetland, I in no instance came on any trace of metal.

All these questions which I have proposed in connexion with these worked stones, must therefore remain for future investigation to answer. The advocates of the "stone age" will tell us with more dogmatism than philosophy, that our implements must belong to the "stone age" of Western Europe, and that they cannot consequently be less than five thousand years old. I must confess, however, that I can see no reason why they should not be as ancient as five million years, or as recent as five hundred.

Having thus touched on the various points of my own labours, in conclusion I will dwell briefly on the results of the expedition taken as a whole.

In the first place, our visit to these islands has had a most beneficial effect in giving a fresh interest and stimulus to researches of this sort. On all sides we heard of the interest taken in our labours; and the effect of our visit should not be estimated by the actual results to which we can now arrive, but by the benefit that science is likely to receive from the impulse given to these investigations.

Everywhere we met with the greatest kindness. Wherever we wanted to dig, we, in no single case, met with the slightest objection from the landlords. The small tenants of the land made no objection to our destroying their crops, on condition that we paid for the damage.

The thanks of the Society are especially due to Mr. Edmonston, who was the means of inducing us to visit Zetland; to the Earl of Zetland, for his handsome donation towards the expenses, and for the trouble he took in providing that every facility should be afforded to us by his local agents in the islands. We are also under obligation to Mr. George Hay, of Lerwick, for his assistance and kindness; and also to the Rev. Dr. Hamilton, of Brassay, who was indefatigable in his zeal in rendering us service.

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I have also to express my grateful acknowledgments to Mr. Smith, the sheriff clerk of Shetland, for having written to some of the landlords on whose property we solicited to make explorations, and who accompanied us whenever his official duties would allow him to do so. To Mr. Gatherer, for his many acts of kindness; and to Major Cameron, for his permission to explore on any part of his extensive property. My thanks are especially due to Mr. Umfray, of Reywick, without whose kindness I should have had far greater difficulty than I encountered in excavating the antiquities of that neighbourhood. I must also thank Mr. Lawrence, of Beddam, for permission to open the tumulus and underground structure at Safester; and to Mr. Johnson, for his permission to explore the "Giant's Grave," at Hestensetter.

Mr. Ralph Tate also reports to me that he owes his best thanks to Mr. Thomas Irvine, of Midbrake, N. Yell; Mr. G. Leisk, Uyea Island; and Mr. Henderson, of Burraroe, S. Yell.

Mr. Roberts, in his paper, says, p. 292, with regard to the urns, etc., from the Muckle Heog, that "I think this is the first instance of a hoard of them having been discovered under circumstances which so satisfactorily connect them with our pre-historic highlanders, the earliest race peopling that country of which as yet we have any good evidence."

This, I believe, to be a mistake; for comparatively large numbers of these rude stone urns have been found in Zetland: and, so long ago as 1841, the Rev. J. Robertson said,* that in "some traces of the dwellings of the Shetland Aborigines there had been found some stone adzes, knives, with drinking cups, lamps, and hammers, of the same materials."

With regard to the researches of my colleague, I have little to remark. Should it be thought, however, that I am responsible for the conclusions at which he has arrived, I would state that such is not the case; we are each only responsible for our separate reports. In reference to the mode of burial in the Muckle Heog, there is some difference of

* *Statistical Account*, p. 87.

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opinion between my colleague and Mr. Roberts. Mr. Tate thinks that there is no evidence of a kist or a lintel of the sort described by Mr. Roberts. The fact, however, that Mr. Tate did not see the lintel, is of some value, although the fact that there was a lintel was given by Mr. Edmonston on the authority of the workmen. I feel it right to say also, that the whole place appeared such a mass of ruins, that there is no evidence to show what was the original structure of the burial places on this hill.

The covered underground gallery seen by my colleague at Fyell, in Unst, together with the one reported to exist, is of great interest, as showing that these structures appear throughout the island, and deserve further research. I also heard reports of similar structures in other parts of the island; but so little is thought of these buildings, that it is very difficult to find them. Should further researches be made in the islands, I feel certain that great light might be thrown on these structures.

During our visit the people seemed so surprised to find us amongst them, that they appeared unable to give us any information as to the position of these antiquities. Future explorers will, I think, find that their work has been made easier by the interest which our visit excited amongst all classes in the islands.

I cannot conclude without expressing my warm acknowledgments to Mr. George Petrie and Dr. Arthur Mitchell for their assistance. I think, too, that science owes a debt of gratitude to Mr. George Roberts for the zeal which he displayed in calling attention to these important relics of antiquity which exist in the hitherto much-neglected Zetland Islands.

It is not now within my province to say anything respecting the races inhabiting these islands, but I may just remark on the large amount of disease which exists in some parts of the islands. In one village, containing only a few houses, I observed one case of a girl deaf and dumb, a dwarf about twenty-two years of age, an idiot girl, a maniac boy, and a very bad case of cleft palate and hare-lip.

The people are generally in a very benighted state, although

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most inquisitive.* Religious revivalism, and its concomitants —insanity and functional derangement—are very common in these islands.

I believe that a genuine interest has been excited amongst the people of Zetland respecting the anthropology of these islands. Much yet undoubtedly remains to be done, and it will be the duty of this Society to do all she can towards accomplishing the labour she has begun. There will after a time be found inquirers on the spot who will be both willing and competent to undertake explorations; but they will require from time to time an official visit from some delegate of this Society to direct and encourage their labours. We shall thus carry out one of our primary objects,—that of advancing genuine science by the acquisition of new facts, and thereby laying up a store of reliable information as a groundwork for our future investigations into the Archaic Anthropology of the British Isles.

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* I was invited by the Secretary of the Zetland Natural History Society to exhibit and describe the weapons I had found. I consented to do this, in the hope that similar implements might be found in other parts of the island. But I regret to have to state that I was prevented doing this, owing to the objections which the deacons of the Congregational Church expressed to a lecture being given by me in their sacred edifice. I was told that it had been discovered that I had taken the chair at some meeting in London at which Dr. Colenso had read a paper. The charge being unfortunately correct, I bowed with all humility to the decision! I am glad, however, to say that this refusal had the effect of exciting the young men of the place to inquiry, and that the publications of the Anthropological Society are being sought for with avidity. But I regretted to be obliged to take these implements away without first publicly exhibiting them.

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XXIV.—*Report of Zetland Anthropological Expedition.* By Ralph Tate, F.G.S., F.A.S.L., etc.

As desired, this report will simply consist of a full description of the explorations personally made, and of the objects of antiquity observed, in the order of time, they were brought under my notice.

July 1.—Examination of the Mückle Heog, Unst.

In the *Memoirs* of the Anthropological Society, vol. i, p. 296, there is a paper by Mr. G. E. Roberts, "On the discovery of large Kist-vaens on the Mückle-Heog, Unst, containing urns of chloritic schist." This communication was but a statement supplied to the author by Thomas Edmonston, Esq., who informed me that he himself was dependent for his information on the workmen, who were engaged in the erection of the flag-staff, on which occasion the sepulchre was discovered. Hence arises the somewhat meagre account of this important place of ancient burial.

The etymology of the words "Mückle Heog" is of great significance. Mückle, *great, large.* Heog is a Scandinavian word, and is equivalent to the Icelandic "Haug," a sepulchral mound. The Orcadian word "how," a tumulus, is derived from the same source.

The Mückle Heog is one of the heights of a chain of hills, composed of serpentine, running east and west to the north of Balta Voe, and south of Haroldswick Bay. The hill rises abruptly from a level of 100 feet elevation, to form a rugged conical peak, 460 feet above the sea level. A bold escarpment, about 100 feet in height, bounds it on the west, and separates it from Crucifield. The Perrie Heog is in close proximity to it, and separated by undulating ground. The Mückle Heog is 460 feet, and the Perrie Heog 400 feet above high water mark, as determined by me by the aid of the aneroid barometer.

The sepulchral mound occupied the extreme top of the hill,

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a cursory examination of which, on the 28th of June, induced us to give up any hope of a return for labour that might be spent upon it. But on the 1st of July I set the labourers to work in removing the enormous accumulation of stones that encumbered, excepting a few square yards around the flag-staff, the top of the hill. The results were the exposure of two semicircular walls on the eastern slope of the hill, running up nearly to the bold escarpment on the west side. The inner wall was distant sixteen feet from the edge of the precipice, and was slightly built of unhewn flattish stones, or slabs. The outer wall was composed of large stones, which either had been rudely dressed into more or less cubical blocks, or selected for their symmetry. It was situated fifteen feet to the outside of the other wall. The space intervening between the two walls was covered with stones, which, until the erection of the flag-staff, had also covered the area within the inner wall.

It was within the inner wall and around it that the skeletons and urns, which were the subjects of Mr. Roberts's paper, were obtained. Apparently there had been no prepared graves; but the bodies, with the urns, were simply laid in the natural hollows and depressions of the serpentine rock, which here appears at the surface in the form of sharp ridges, with intervening furrows. I saw no large slabs, adapted as covers to any graves, among the *débris* on the hill.

The whole interior space within the wall was thoroughly examined. Portions of skulls of at least two individuals, and a barrow-load of other bones, with fragments of steatite pots, were found; but, from the very disturbed nature of the materials, etc., no positive statement can be made as to their manner of deposition. So, also, as to whether the numerous bones of horse, of fish, and of birds, and the shells of molluscs, found among the *débris*, were actually in association with the human remains.

As to the latter, great caution must be used; the horse is common and indigenous to the islands; many die owing to the scarcity of food in severe winters, their bodies are left to the ravens, crows, and black-backed gulls; and these birds might easily have been the agents of transporting the fleshy bones to

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the crown of the hill, and in this way they may have become mingled among the stones of the cairn. So, also, the occurrence of fish-bones can be easily accounted for,—gulls and other fishing birds carrying their booty to the top. Among the more common molluscan shells, that of the limpet is very frequent among the *débris* of this and other cairns; the oyster-catcher (*Hæmantopus ostralegus*), which lives upon the limpet, may in a like manner have transported the shells to where they are now found. Thus, human agency need not be called into question for the occurrence of the animal remains I have referred to on the tops of hills. I noted on the top of Saxiford, Perrie Heog, Gallows Hill, etc., the same thing.

Greater reliance can be placed on the relation of a stone implement, picked up by Dr. Mitchell, F.A.S.L., on the Mückle Heog, to the human remains buried here.

The implement is a rolled pebble of serpentine rock, of an oblong ovoid form, four and a half inches in length, seven and a half inches in circumference at the larger end, and gradually tapering to five inches at the other. It is slightly contracted in the middle, and can be conveniently grasped by the hand. The larger end is fractured, as if by being used in the form of a pestle; its size seemingly well-adapted for such, and from its weight quite capable of crushing the shells of molluscs, the animals of which may have been an article of food among the possessors of these stone implements.

On the outer side of the inner wall I discovered a series of graves that indicates another mode of burial among these people.

On the outside of the inner wall, I found several flat stones, varying from one and a half to two feet in length, and about nine to twelve inches in breadth. The stone in each case covered a few human bones, principally teeth and phalanges, with a few remains of horse, birds, and fish. The bones were reposing on a slight bed of angular gravel, beneath which was a bed of an inch or so in thickness of a black, stiff, unctuous, clayey substance. This was overlying a bed of red, or yellowish clay two or three inches in thickness, which covers the solid rock.

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In every case, there were the same materials and order of superposition observed; the black material in no instance was found extending beyond the confines of the covering stone.

An examination of the human bones prove them to be those of children. The black material is such as I have seen in kists where the body had evidently been burnt and the ashes only preserved; and this substance probably results from the impregnation of the clayey floor of the grave with the oily and decomposed animal matter. In the case of these small graves, it would indicate that the bodies had been burnt on the spot, and the charred remains with the few bones that had escaped the destructive element had been deposited as I found them.

2nd July.—On the top of the Perrie or Little Heog (400 feet), I discovered oblong depressions in the serpentine rock, but they presented no indications of having been used as graves. A single grave, exactly similar to the graves on the outside of the inner wall of the Mückle Heog, I found; beneath the stone were a few fragmentary human bones, indicating a small individual, with a few bones of birds and two teeth of a small horse, overlying a similar series of deposits as in the graves on the neighbouring height.

3rd July.—In the gully that separates the Mückle Heog from the Crucifield there is a disturbed tumulus, which went under the title of the Place of Justice. The top of the Mückle Heog, also named the Place of Execution and Hanger Hill, is reached from the former by a flight of rude steps. A tradition prevails that whatever criminal ascended the steps to the Mückle Heog never came down alive. But if an accused, after hearing his sentence, was desirous to appeal to the voice of the people, he tried to escape in a direction that led to a circle of stones on Crucifield; if he could reach that sacred ground in safety his life was preserved.

The tumulus, now a confused heap of stones, contained four kists; three were exposed to view at the time of my visit, the fourth that I discovered was accurately covered by a flat head-stone, and was apparently undisturbed, but the grave was

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empty. "Two bodies, supposed to have been executed criminals, were about one hundred years ago found buried in disorder here."—(Hibbert.)

The kists 1, 2, and 3 were narrow, and could not receive a body of an ordinary full-grown person lying at its full length. No. 4 was transverse in its longer diameter to the length of the three others, and is about six feet long. In each case, the coffin is formed by two long stones for the sides and two smaller ones for the ends, all set on edge.

3rd July.—A few yards to the north-west of the above-mentioned tumulus is another sepulchral mound of loose stones. This I thoroughly worked out, but found no indications of its being a place of burial, nor of the treasure reputed to be buried there with Harold. Dr. Hibbert (1822) writes, "This barrow was opened some years ago."

I made some other excavations during this day, but of a character not worth recording.

4th July.—Visited the sands at Norwick, Unst, I having been informed that about fifty years since the skeleton of a man, with steel weapons and trinkets, was disinterred from the bank of blown sand; but as no one could point out the exact spot, on such an ever-changing surface, from which the human remains, etc., were taken, I did not venture upon a search.

7th July.—Examined an ancient covered gallery at Fyell, Unst, which was opened about two years ago. It is of a semi-circular form, two feet or so beneath the arable land, about thirty feet in length, three feet in breadth and height, widening out at the western extremity to the form of a chamber of five feet square; ponderous slabs of mica-slate form the lintels. These stones have been transported from Norwick, which is the nearest depôt for such, and distant two miles. Many stone urns and implements were removed from this depository.

During the delving of the ground this spring by the present tenant, he struck upon what he stated to his wife to be another "Fairy Ha';" the spot he could not point out to me. I was not anxious to prosecute a search, as I hoped to meet with good work in other districts, and this might be re-

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served for future exploration when, in the mean time, the exact whereabouts of this second barrow may be ascertained.

ISLAND OF UYEA.

11-13th July.—Uyea signifies an island of preeminence, and this derivation is confirmed from the many objects of ancient rite occurring upon it.

Places of Interment. On the extreme top of the Wart of Uyea, about 250 feet high, the most elevated point in the island, some fifteen or twenty charred urns, containing calcined bones, had been found from the year 1814 to within a few years back. I worked here, but found only fragments of urns; the urns had been deposited in the natural hollows surrounding the top of the hill, and covered with a few stones. The majority of the urns are larger than those from the Mückle Heog, but are composed of the same material, coarse steatite, —klimmel or klibber-stone of the people. Steatite is not found in the Island, but occurs in the neighbouring one of Fetlar.

A low flat cairn to the west of the Wart gave me no results.

To the south of the farmstead, a cairn, some fourteen feet in height, was removed about the year 1830, and disclosed a stone kist of the usual form, it contained only an urn with ashes.

On the top of a knoll by the sea, to the south-east of the farmhouse, a grave set round with eight oblong stones on end, in a rude circle, was opened a few years since; a thighbone was only found within.

Stone Circles. Several of these occur throughout the island, —one of large diameter occupies the plain to the south-west of the Wart. Three occupy the tongue of land known as Tourneness,—all presented much the same character. The most northerly exhibited a circular wall of about twenty feet diameter, with large stones set on end, and raised about two feet above the level of the interior area, within the circumference of the wall, at a distance of three or four feet apart. Three large stones, blocked together, formed a rude seat, —this seat of honour, through a buried stone, bore 25° west of south (magnetic). A trench was dug through the centre;

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others driven from it to the larger of the standing stones. I found, two feet beneath the surface, a flat stone three feet long by two to two and a half broad, lying north-west and south-east, beneath which was a semicinder-like mass, one quarter of an inch in thickness, and occupying a space but little less than the surface of the stone.

Another circle communicated with a smaller one, which occupied a less elevated position. Three large upright stones, about three feet above the ground, and deeply sunk, were rugged beneath. I also trenched through the circle.

To the north-east of the Wart of Uyea are two quadrangular groups of stones, a large one, about ten feet square, leading up into an oblong one five feet by four.

ISLAND OF YELL.

July 15th.—Excavated through the Giant's Grave (a cairn) at Midbrake, and around a *standing stone* at Porple, North Yell. The standing stone, four feet and a half above the soil, is composed of klibber-stone, which is not found in the immediate neighbourhood.

July 17th.—Cairns beneath the banks of blown sand at Ness, sometimes called Brackna Sands, North Yell. The present site of these cairns is at the open end of a small gulley, in the line of the sand cliffs; the most northern cairn is 518·76 feet from high-water mark, and about five feet elevation. The cairns are all on the same level, and respectively situated.

No. 1	to No.	5,	due east,	36·96	feet.
,, 1	,,	4,	. . .	66	,,
,, 1	,,	2,	. . .	16·5	,,
,, 2	,,	3,	. . .	15·16′	,,
,, 3	,,	4,	. . .	37·3′	,,

The cairns are twenty-one feet below the brow of the sandbank. Up to the year 1818 the sandbank was intact, and pasturage was upon its top; between 1818 and 1820, the sand was begun to be removed; and previous to 1863 the present gully was formed, and the cairns were exposed. In 1863, Mr. Irvine, the proprietor of the land, examined to the bottom of the cairns Nos. 1, 2, 3, and 4. In each case, on removing the

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first layer of stones (*i. e.* from nine to twelve inches from the top), a "peculiarly black unctuous earth" was found resting upon calcined bones, mixed with sand and black earth. Some charcoal was found among the stones; but no implements or any objects were found in the cairn; many of the bones are encrusted with carbonate of copper (?). On my visit, the cairn No. 5 was five feet beneath the sands, which had accumulated since 1863, but the position of the cairn was indicated by a series of stones connecting it with cairn No. 1.

The cairn had been but slightly broken into by Mr. Irvine, from which he had removed almost the whole of a skeleton of a small individual. The head was reposing on the breast, and the skeleton lying in a direction the same as, and near to that of another young individual obtained by me, but a little above the floor of the cairn.

The results of my working at this cairn (No. 5) were the finding of three skeletons, all at the base of the cairn. Around the bodies, which were laid on the sands, an accumulation of beach stones, which was then five feet high, had been made. All the stones are water worn, generally heavy beach stones of granite, gneiss, mica slate, and porphyry.

The position of the *first skeleton* (of a young individual) was as follows,—the skull was resting on the breast, the body extended, and the arms lying by the sides,—bearing east and west. The skeleton in this case, as in that of the others, was set round with large stones, and other stones partly housing the skeleton in, and partly placed lintelwise.

The first adult skeleton obtained was lying fully extended on the left side, facing the west, bearing 70° west of north, and reposing on a bed, about two inches thick, of the bones of the piltack (the young of the coalfish, *Gadus carbonarius*). The second adult was obtained with the legs and arms slightly bent on themselves, lying on the left side, but a little more westerly than that of the other one. The fish-bones were underlying it from the shoulder to the pelvis, as in the former. Only a few limpet shells were found among the stones at the base of the cairn, and some charcoal in the upper part.

Mr. Irvine informs me, that he remembers the sandbank as

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continuous, where now the gully exists, as early as 1797, and that documentary evidence indicates it to have been so for a period of nearly three hundred years.

BURRAVOE, SOUTH YELL.

19th and 20th July.—I was induced to visit the above place, for I had been told that Mr. Henderson, of Burravoe, had seen sculptured rocks in his neighbourhood. Here I was sadly disappointed. Mr. Henderson had seen such in so many places that he could not exactly show me where; after two days' futile search, the place was abandoned by me. Whilst here, I cut through a cairn-like structure known as the "Fairy Mound," of which I have nothing to record.

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XXV.—*On the Head-Forms of the West of England.* By John Beddoe, B.A., M.D., F.A.S.L., F.E.S., Foreign Associate of the Anthropological Society of Paris.

In anthropology, as in chemistry, and other progressive sciences, the disposal or modification of old theories, renders ambiguous or misleading terms that once appeared to have a definite and unequivocal meaning. Kelt and Keltic are words which were useful in their day, but which have ceased to convey a distinct idea to the minds of modern students of the science. I ask the indulgence of those who on this ground would object to the frequent use of these words in the present paper. I could have employed no others in their place without still greater risk of being misunderstood. The sense in which I use them will, I think, become tolerably clear in the sequel, and I apply them, in fact, to the common element of race in ancient Gaul, Britain, Ireland, Noricum, and Keltiberia.

It is my principal object, in the present paper, to throw some additional light on the vexed subject of the Keltic skull-form, by adducing a series of unpublished facts. These facts are derived for the most part from mensuration of the heads of natives of the south-western counties, and of Wales and Ireland. The people subjected to examination were mostly either inmates of certain factories and workshops which I visited for the purpose, or applicants at the Bristol Royal Infirmary; but, as a certain number of persons belonging to the professional and trading classes were added, it is probable that the general population, except its purely rural section, was fairly represented.

It can hardly be said now, as it was, not many years ago, that the question as to the true Keltic head-form is as far as ever from being settled. The materials for its determination which have been accumulated and utilised by Davis, Thurnam, and Daniel Wilson, by Broca and Belloguet, and the acute obser-

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vations of Pruner-Bey, have certainly placed us in a far better position for its consideration than the one we occupied when Professor Nilsson vainly demanded of British authropologists a typical Keltic skull. Still the differences of opinion founded on these materials continue to be great, and are complicated by the doubt whether any or many pre-Keltic races have left their traces not only in riverbeds, caves, and kjökkenmöddings, but in the contents of our barrows and the blood of our people; and, moreover, by the obscurity of the relations *inter se* of the Kymric, Gaelic, Belgic, and Gallo-Keltic stocks.

The opinion formerly predominant in this country, as in France, that the Keltic skull was long, was somewhat rudely shaken by the revelations of the *Crania Britannica*. Dr. Barnard Davis, while claiming for the average Briton of the barrows a moderate degree of brachykephalism, has never, so far as I am aware, done the same for his supposed modern representatives. His observations in Kerry (*Cr. Br.*, p. 200,) equally with his extensive collection of modern and mediæval Irish skulls, indicate a tendency to length rather than to shortness. His colleague, however, in his recent valuable paper in the Anthrop. *Memoirs*, vol. I, has gone further:—"In England," he says (p. 127), "the prevailing form of skull is ovoid or moderately dolichokephalic, combined with a more than medium stature, and generally with a fair skin, and light eyes and hair. A much less common form of head is the brachykephalic, usually found in connexion with a less stature, and with a dark skin, eyes, and hair. The first of these two types is Teutonic, and to be traced to an Anglo-Saxon and Scandinavian source, whilst it is almost equally certain that the second is derived from our British or Keltic ancestors."

All this seems to be assumed as a postulate by Dr. Thurnam. I find, however, on analysing my observations, that they distinctly negative the most important part of the statement. On the one hand, eighty-one heads, which by my method of measurement, in which the glabella is assumed to mean the prominent spot between the superciliary ridges, yield a modulus of more than eighty per cent.; heads, therefore, which are ordinarily called brachykephalic, belonged for the most part to

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individuals with light hair, and an average stature somewhere about the mean. And, on the other hand, of twenty-five Englishmen having black or brownish-black hair, the average index of head-breadth is so small as 76·5, which is the lowest I have met with in any set of men. Eight Welshman having black hair, yielded the same modulus to a fraction as thirty-eight who had hair of other colours, though I must concede that eight black-haired Kerrymen had heads broader by ½ per cent. than twenty-four others. The observations of my friend Mr. Hector MacLean, on the islanders of Islay and Colonsay, bear me out on this point very strongly, his black-haired men, twenty in number, yielding a modulus of seventy-six, or three per cent. less than that of their lighter-haired neighbours.

We shall see the bearing of all this presently. In the meantime it is worthy of remark that the remaining part of my friend's postulate is more correct. Mr. Maclean's measurements, and my own, both indicate that a notable, though not very great, inferiority in stature and bulk, does, on the average, characterise the black-haired type.

I shall now proceed to state, from the narrowest to the broadest, the moduli, or indices of relative breadth, which I have found in the living heads of natives of the following districts. I shall introduce seven Hanoverians from the neighbourhood of Bremen, as representatives of one of the Teutonic

No. observed.	DISTRICT OR COUNTRY.	Modulus.
40	Wiltshire, North and West	76·56
33	Munster (mostly co. Cork)	76·75
53	West Somerset	76·9
20	Kerry	77·6
10	Belgium (Walloons)	77·6
50	South Wales and Monmouthshire	77·7
30	South Devon	77·9
50	Gloucestershire	77·9
50	Bristol	77·9
80	East Somerset	77·9
7	Cornwall	78·0
30	Sweden (coasts)	78·3
50	North Devon	78·3
29	South Somerset	78·6
20	North, South-east, and Centre of England	78·7
5	Norway	79·8
7	Near Bremen	79·9
8	Near Uleaborg, Finland	83·6

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tribes that took part in the conquest of England,* and thirty Swedes, partly for a similar reason, and partly to show that the Swedes are not so universally and intensely dolichokephalous as most people seem to believe. Also ten Walloons from the province of Namur, as representatives of a race more or less Keltic in blood, and eight Finns as an example of a truly brachykephalous people.

The conclusions or inferences I should draw from this table would be as follows :—

That, inasmuch as there is reason to suppose that the comparative breadth of a cranium, is less than that of a living head, with its integuments, etc., there is ground for believing the people of the West of England to be decidedly dolichokephalic. That the same statement applies to South Wales, and to Munster.

That the difference in this respect between Anglo-Saxons in general, and Kelts in general, is immaterial, and that if any such difference does exist, it is quite overshadowed by the tribal or sectional differences, between Saxons and Kelts *inter se*.

That the table affords no support to the view that the Keltic skull has been, or would be narrowed by an admixture of the Iberian type. For there is more reason to suspect the presence of Iberian blood in Cornwall and South Wales, than in West Somerset, and more in Kerry than in Cork.

That if the modern Gaelic skull differs from the Kymric or Cambro-British in this respect, it is probably in the direction of greater narrowness.

That the heads in North-western Wiltshire are remarkably long. Lest this should be attributed wholly to the fact that Wilts is more Teutonic than any county to the west of it, I will remark that the twenty heads from the other Teutonic districts of England occupy the other extremity of my scale, and, moreover, that my Wiltshire list includes some specimens whose other physical characteristics are distinctly Keltic, and

* I have had no opportunity of measuring Frisian heads; judging by the eye, I believe Dr. Lubach's opinion of the dolichocephaly of the Frisians to be correct. Nor have I measured any Danes.

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who yet have very long heads. Have we here the traces of Dr. Thurnam's dolichokephalous long-barrow-men?

The mention of these same long-barrow kymbekephali transports one at once from the region of dry and repulsive modern fact into the enticing and glorious uncertainty of prehistoric theory. For my own part, neither Dr. Wilson nor Dr. Thurnam has as yet quite convinced me that there was a distinct megalithic race, still less that that race was Iberian.

In forming my idea as to the existence of a common Keltic type, I have been guided very much by the evidence of colour. "Colour," said Sir Henry Rawlinson, while presiding over the Geographical Section of the British Association at Bath, "is of no value in the consideration of types." From this statement of Sir Henry's I most emphatically differ. It has never hitherto been proven that chromatic is more changeable than cranial type, where there is no intermixture of blood; and to assert that it is so is at least premature.

Now, there is a certain chromatic character, the frequency of which I have myself observed in all parts of Ireland, in most parts of the Scottish Highlands and of Wales, in Cornwall, in the West of England to a gradually diminishing extent as one travels eastward into Wessex, in Champagne, and less markedly in the Walloon country, and in Piedmont, and which, on the trustworthy evidence of M. de Belloquet, I believe to be common also in Brittany. I mean that conjunction of blue, cærulean or ashgrey eyes, with dark hair, brows, and lashes, which Dr. Barnard Davis calls, for shortness sake, "the Keltic eye." Having found this combination frequent everywhere where Keltic blood may be supposed to abound, and scarcely anywhere else, I believe it to furnish a pretty good index of the presence of Kelts.

In the next place, is there any cranial form which abounds wherever the "Keltic eye" abounds? With the diffidence which becomes one who has not made craniology a special study, I incline to think that there is. It is the one which my friend Dr. Daniel Wilson, in his recent and important paper on the characteristics of the ancient and modern Kelt, designates as the pear-shaped or insular Keltic type, and

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which he describes as equally long with the Anglo-Saxon, but marked by a sudden tapering in front of the parietal protuberances, and a narrow prolonged frontal region. Most of the other eminent anthropologists whose names I have cited, from Retzius onwards, have more or less clearly, and with some difference of opinion on the point of length, indicated a somewhat similar view; but none of them, so far as I can recollect, have so clearly and tersely expressed it. I myself, working independently of Dr. Wilson, and in a different manner, had educed the same conclusions, which have since been confirmed by further investigations, including a few upon Swedish, German, and Walloon heads; and, moreover, by a visit to Rheims, in Champagne, where, in the elaborate sculptures of the monument of Jovinus, I had the satisfaction of beholding the same marked features, square forehead, prominent brows, and angular chin, which almost equally, to the present day, characterise the Belgic Kelt of the continent and the Firbolgian of Arran.

I do not think Wilson's term, "pear-shaped," very happy; that of "coffin-shaped" would perhaps be better, but would be liable to convey the idea of great length, which is not desirable. The heads to which I should apply it vary in length, but are usually rather dolichous. A nearly straight line extends from the outer angle of the forehead to the point of greatest breadth, which is generally parietal, and placed far back above and behind the meatus auditorius; while in Saxon skulls this point is generally temporal, and placed above the meatus, at a rather low level. The forehead has great squareness when viewed from above, and from behind diagonally its angle and the malar bone are both seen to be prominent, so that the eye can hardly be got to show in profile: the zygomatic diameter may or may not be large, but it is placed well forward, and *appears* large in a front view; and this fact, with the flatness of the anterior and fronto-lateral region, would cause the skull to be phænozygous. In the Saxon type, on the other hand, with which the Swedish generally but not exactly agrees, the forehead is rounded laterally, the eye prominent in profile, the greatest zygomatic

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diameter lies far back, and the tendency of the skull to ellipticity renders it aphænozygous. The brows are, in the Keltic type, prominent and low, either oblique, or, which is very common in Ireland (see Davis, *Cr. Brit.*, p. 201), "forming, with the projecting superciliary ridges, a horizontal line above the eyes." The forehead above the brows is rather flat, in intelligent men often elevated and square (Edwards' Kimric type), but in the bulk of the population low, "gaining," as has been said, "in length what it wants in height." The upper profile of the skull has generally a gentle and regular curve as far as the upper occipital region; this is generally protuberant, and whether so or not, is oval in section: this point we owe to Pruner-Bey, but I have confirmed it in a good many instances. "Receptaculum cerebelli small," said Retzius of a particular skull, an Irish one. (*Cr. Brit.*, Description of Ancient Hibernian Skull, plate 55, p. 2). I think the remark applies to the best examples of the type, but my method of measurement does not allow me to test its correctness.

The facial features in several varieties or crosses of this type have been well described by Dr. Barnard Davis. The most constant are the rather deep-set eye, the sinuous long-nostriled nose, prominent at the tip, and the always angular and often narrow chin. A slight degree of prognathousness, producing a vertical furrowing of the cheek, is so common, that it may perhaps be a race-character. Length of face varies like length of head, but is generally considerable; in the Firbolgs of Arran, and in many Walloons, it is conspicuously great.

Such is the prevailing type in Ireland generally; and I think it is more conspicuous than any other in the greater part of Somerset, and perhaps in South Devon. It is common in other parts of the west also, including certain tracts in the valley of the Bristol Avon, which, according to Dr. Guest, long remained Damnonian. The ovoid head, tending to ellipticity when long, to roundness when short, seems to predominate in all the upper part of Wiltshire and of Gloucestershire, and occurs in more or less force elsewhere, notably about Bideford, and along both coasts of the Bristol Channel. But in the Vale of Thornbury and the Forest of Dean, as well as in

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Wales and North Devon and Cornwall, one or two other types rise into importance. One of these I believe to be Iberian. In this the form is distinctly ovoid, as in M. Broca's Basque skulls. It is conjoined with a dark, almond-shaped, and often obliquely set eye, quite Turanian in character, with arched or oblique eyebrows, and with other features much resembling those I have seen in photographs from the Western Pyrenees. Another may be described as rounded-oblong in horizontal section; it is broader in the forehead and fuller in the temples than the ordinary Keltic head, of which it may, however, be only a variety or cross. It abounds in Wales and North Devon. My friend Mr. David Davis, an acute observer, considers it to be the special Kymric form, as does also Mr. D. Mackintosh. Something like it reappears in the north of England among the Kymro-Scandinavian breed. In Devon and Cornwall some find Romans and Phœnicians: I cannot say whether they are right or not.

Let us now see how these facts as to length, and these views, partly based upon measurements, on the other parts of the subject, can be reconciled with the contents of British and Gaulish barrows. There are great difficulties in the way, to which I will advert presently, but I do not think such a reconciliation impossible. In the first place, so far as Ireland is concerned, these difficulties are non-existent. The ancient Irish skulls, as well as the mediæval and modern ones, are long; the four in the catalogue in the *Crania Britannica* average 76·2, and the two in the museum at Kilkenny the same modulus to a fraction. Moreover, the physiognomy and proportions of these skulls agree with my description, and are also, as may be seen in the two figured by Dr. Davis, thoroughly Irish. I would treat with respect any opinion put forward by Sir William Wilde; but I am as yet unconvinced of the existence of any race of globular-headed Irish, though I by no means absolutely deny it.*

* Of ancient French skulls I know but little, but that little rather strengthens my views; for during a recent visit to M. Broca, I convinced myself that some if not all of the "Bellovaque" skulls agreed well with our Keltic type, and those of the Merovingian Franks with our ovoid Anglo-

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In England we have to deal with the duplicate theory of Thurnam, and the triplicate theory of Daniel Wilson; or, if we adopt the single race theory of Barnard Davis, we have to account for the disappearance of that tendency to brachycephalism which he attributes to the majority of his Britons. I find the pear- or coffin-shape which I have described, in a great many of the skulls figured in the *Crania Britannica*, both long and short, *e. g.*, those from Parsley Hay, Ballidon Moor (bating the prominence of the centre of the forehead,) Arras, End Lowe, Codford, Juniper Green, Bincombe, and the long skull from Uley, while the typical ovoid Saxon form is exhibited in the example from Linton Heath, and less distinctly in others, as those from Wye Hill and Brighthampton. There are, however, cross exceptions. Thus the round skull from Tosson, Northumberland, supposed to be late British, has a very German look. The coffin-shaped "Saxon" from Harnham, if that burying-ground belonged, as Thurnam thinks, to the churls and thralls of the neighbourhood, may well have appertained to a man of British lineage. If it be objected that the filling out of the temporal region may arise in a race as a consequence or concomitant of advancing civilisation, I can only reply that the ancient Saxons and Merovingians certainly did not rank very high in that respect, any more than some of our "bullet-headed" boors of the present day; and that the round-headed barbarian of Tosson must in that case have been born long before his time.

As for the supposed brachykephalism, or inclination towards brachykephalism, of the ancient British Celt, two or three considerations suggest themselves. The change, if any change there was, took place very long ago. Daniel Wilson has shown evidence in favour of the mediæval Keltic skull having been long; and we can hardly suppose that under somewhat similar influences the Keltic skull was growing narrower, and the German one wider. If there really was a megalithic race, it

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Saxon one; and moreover, that the form of M. Broca's Basque crania was very much that of some modern Silurian heads. In the valley of the Meuse, the long skull of Engis, and the shorter ones of M. Dupont's reindeer-men, are certainly not adverse to my view in any way.

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may have survived through the bronze period in serfage, rarely appearing in the barrows, and have ultimately fused with its conquerors, modifying their skullform. But if the race was substantially one, and the kymbekephali were merely aberrant specimens, we have to do with the familiar phenomenon of a wide range of proportionate length and breadth, such as occurs in most races.* Change in the mode of nursing infants may account for one or two per cent. of additional length, and different methods of measurement for something more. Dr. Davis, for example, understands by the glabella the smooth spot, or slight depression, generally found about an inch above the fronto-nasal suture, while my glabella is the point of union of the superciliary ridges. A frowning beetle-browed skull, such as many of the ancient British ones, would therefore yield in my hands a slightly longer antero-posterior diameter than in his.

* My 30 Swedes varied from 72·4 to 85·5.

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XXVI.—*Report of Explorations conducted in the Kirkhead Cave at Ulverstone.* By J. P. Morris, Esq., F.A.S.L.

INTRODUCTION.

The Kirkhead bone-cave is situated on the breast of a steep hill on the Eastern shore of the Promontory of Cartmel, and about eighty-five feet above high water mark. So far as is known, its dimensions are, length forty feet, width twenty feet, height from surface of deposit, fourteen, nine, and seven feet under three separate domes.

The floor of the cavern consists of bones, earth, angular fragments of limestone, and water worn pebbles of clay slate indiscriminately mixed.

Permission to examine the place having been obtained of J. Young, Esq., upon whose estate the cavern is situated, several diggings have been made, and many objects of interest found. These consist of portions of human crania, especially of the frontal or parietal bones; human leg and arm bones, and vertebræ. A few inches below the surface, I found a Roman coin of the Emperor Domitian, and at a depth of about seven feet, a stone implement of a rude unground type, and a metatarsal bone of a pig, with an evenly bored circular hole drilled through it. This, I at first imagined had been an amulet, but I have since been informed by Professor Busk, that it partially resembles the bone whistles found in the South of France.

Two pointed bone implements were also found, and several fragments of rude unbaked pottery.

Of the various animal remains met with, the most numerous are the goat, kid, pig, boar, fox, badger, two species of deer, *Cervus elaphus*, and *C. capreolus*, and an immense quantity of bones of the wild goose. Of those of which only a few remains are met with, I may mention the *Mus rattus*, *Arvicola amphibia*, *Felis catus*, one posterior molar of horse, two canines and a molar of the dog. The bottom of the cavern

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has not yet been reached, and several hundreds of tons of the superficial bone earth yet require examining.

Some time ago, in quarrying stone for an embankment, another bone cave was discovered in a bluff limestone headland called Capes Head, on the western shore of the same peninsula of Cartmel. At the instance of his Grace the Duke of Devonshire, some portion of it was excavated, but I am not aware of anything important having been found, except a few remains of the smaller *Ferœ naturœ*. Being in the neighbourhood in May last, I was induced to examine the place, and on breaking a piece of stalagmite, I found several fragments of charcoal closely embedded. This evidence of the human occupancy of the cavern led me to visit it again, upon which occasion I found a human humerus in the calcified mould and stalagmite adhering to the side of the cave, and also found a badger's skull containing one molar tooth. On a subsequent visit I found a human malar bone, and several animal remains, and I have no doubt that many interesting objects might be found, should a thorough excavation be made.* This cavern at the present time is eighty-seven feet long, fifteen feet broad, and about ten feet high.

REPORT.

"And though he's buried in a cave,
And trodden down with stones,
And years have rotted off his flesh,
The world shall see his bones!"—*Hood.*

"There are those who will lie dead for twelve thousand years to come, or twelve millions, for anything you or I know, who will tell strange tales at last."—*Dickens.*

MANY objects of anthropological interest having been found in the Kirkhead cavern, with the sanction of the council of this Society a local committee was formed for its exploration, consisting of Drs. Anderson and Barber, Mr. W. Salmon, F.G.S., and the writer. In order to meet the expenditure necessary, circulars were issued, addressed to Fellows of the Anthropological Society, and others interested in the science;

* Since writing the above, I have found two fragments of coarse unglazed pottery, similar to the specimens from Kirkhead.—J. P. M.

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and, having received several promises of support, we commenced operations on the 4th of September.

A description of the cavern having already been read before the Society, and published in vol. ii, page ccli of the *Journal*, I will briefly confine myself to the present exploration.

The entrance to the cavern being only about three feet high, our first object was to cut a barrow-road through a large bank of earth fronting the cavern mouth, which was accomplished in two days. In this cutting several fractured animal bones were found, belonging principally to the ox, deer, goat, badger, and fox. Having now a good clean road, our next operation was to dig a trench across the cavern mouth, so that we should have a breast of earth before us of about eight feet in thickness. In digging this trench, several pieces of rude unbaked pottery were found (specimens 1, 2, and 3), and a human malar bone. Immediately within the cavern, and forming a semicircle about its mouth, several huge blocks of stone occurred, having evidently rolled in from the overhanging cliff. These formed a serious obstruction to us, and had to be blasted away. Under one of the pieces of rock, and about four feet below the surface, my son, who accompanied me, found the fluted earthenware bead (No. 4). Progressing carefully, every spadeful of earth being closely examined, the next object we found was a bronze ring (No. 5); this was also at a depth of four feet. Nearly a foot beneath this ring a bronze pin was found, coated with a green vitreous enamel (No. 6). On the left-hand side of the cavern, and about six feet deep, we found the head of a femur, rubbed down to a disc shape, with a hole bored through its centre (No. 7). This singular object has probably been worn as an amulet, or ornament. In close proximity to this, a human femur was found, and a small portion of the under jaw of a child of about five years of age (No. 8), the permanent teeth appearing below the alveolar arch. Our next discovery was a fragment of what appears to have been a circular disc of polished granite (No. 9). This specimen was much larger when found, but was so friable that it crumbled away in the hands. At a depth of seven feet we came upon a large block

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of stalagmite, and on breaking it up I found no bones, but the very beautiful impression of a leaf (No. 10).

We had now, Sept. 17th, reached the middle of the cavern, when the highly finished bronze implement (No. 11) was turned up. This beautiful cutting instrument has, no doubt, been used for domestic purposes, and has, after being cast, received a high polish, apparently with a piece of sandstone. Near the same place we also found a bronze ring (No. 12) similar to the one already mentioned, and several human bones. Our next prize was the fragment of ornamented bronze (No. 13), which has either been a trefoil or cruciform-shaped fibula, or a portion of some horse-trapping; and in the immediate vicinity, the small bronze tube (No. 14), and the amber bead (No. 15); the latter, I am sorry to say, was broken in its removal. On the 25th of September we found the left inferior maxillary of a human adult (No. 16), and within a short distance of that the large amber bead (No. 17). On the same day, and at a depth of seven feet, the piece of limestone breccia containing the flint (?) flake (No. 18) was exposed. I have not attempted to develope this interesting specimen, but, with the exception of washing off the soil, have sent it as obtained.

The next object of interest discovered was the bronze dagger, or spearhead (No. 19), about ten feet from the end of the cavern, at a depth of six feet; and close by, with a small fragment of an urn (No. 20), apparently having been worked out of some soft micaceous stone, the piece of polished bone (No. 21). We had now almost reached the end of the cavern, taking off eight feet of the earth in our course, when, in clearing out the right-hand corner, we found the very beautiful and perfect bronze celt (No. 22) at a depth of five feet. Like other implements of ancient date, this valuable relic has been run in a mould of stone or metal, which is evidenced by its peculiar "skin." On this point, having had considerable experience in casting, I can speak with some confidence. The fluidity of the bronze at its formation has not been perfect, or the mould, not having been sufficiently heated, has chilled the metal; for the upper parts of the loop

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and socket-rim are slightly "faint run." From the appearance of the joints, it has undoubtedly been untouched after leaving the mould, the "fin" still remaining, except upon the cutting edge, differing in this respect considerably from the highly finished implement (No. 11). The specimen I have called a fibula or horse-trapping, is a much ruder casting even than the celt, and has been used just as it left the mould, as the "fin" round it, for so small an object, is large and rough. From its appearance, I suppose it has been executed in fine sand or loam; and the upper part of the mould fitting very badly to the under part, causes the casting to be what is technically called "twisted."

In the same corner with the celt we revealed a piece of rude pottery with holes (No. 23), and at the extreme end of the cavern a human frontal bone (No. 24).

Throughout the whole of our excavations human and animal remains were found at all depths, but no two bones together, and all more or less fractured. Some are gnawed by the smaller carnivora; and one, the portion of a human fibula (No. 25) has been cut and pointed by human agency. The bones I send will, no doubt, be carefully examined by our talented secretary, Mr. Carter Blake; and, should anything special appear, his remarks will be appended to these notes.

To abler archæologists than myself I leave the task of assigning an age to these interesting relics of a bygone period. The discovery, however, of a flint flake, assuredly of human manufacture, associated with bronze implements, appears to me to strengthen the opinion advanced by our honorary fellow, Mr. T. Wright, that the theory of a succession of ages of stone, bronze, and iron, has no foundation in fact.

In the present half-explored state of the cavern, it would be premature to speculate upon the causes which induced the influx of so large a mass of deposit at such a great elevation above the sea-level; and I regret that, in consequence of our funds being overdrawn, we have been reluctantly forced to await further aid.

I would here thank the three gentlemen associated with me in the exploration for their ready assistance and advice when-

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ever occasion demanded. I desire also to express my thanks to J. S. Young, Esq., upon whose estate the cavern is situated, for the ready permission granted us to make whatever use of the cave and its contents we thought fit.*

And now, on behalf of the subscribers to the "Kirkhead Fund," I have much pleasure in presenting to the Society the results of our researches.

Postscript.—There is one point respecting the human bones which I forgot to mention. I don't know that it is of much importance, but I have always found that bones in wet soil keep better than in dry. Some of the human bones from Kirkhead scarcely contain any animal matter, whilst others have nearly retained the whole. This I attribute to the presence or absence of water in the soil, some parts of the deposit in the cavern being saturated with water, and whenever such was the case the bones were in better condition.

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* I have recently had placed in my hands a small volume of poems published in the year 1818, by the late Mr. John Briggs, of Cartmel. In this volume, a poem appears entitled "An Elegy, written in the Chapel Lands," to which is appended the following note:—"The Chapel-lands is a field near Allithwaite, in Cartmel, the property of the late Edward Barrow, Esq., of Allithwaite Lodge. Though tradition is perfectly silent with regard to anything which might tend to gratify the curiosity of the antiquary, yet the discovery of a stratum of human bones, regularly disposed, about three feet below the surface of the ground, evidently indicates this field to have been a receptacle for the dead;" and in the poem the following couplets appear:—

"Here have they slept from ages so remote,
That e'en tradition leaves the tale untold."

And again,—

"Here might some Druid's sacred circle stand,
And KIRKHEAD CAVE his lone asylum be."

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XXVII.—*On the Influence of some kinds of Peat in Destroying the Human Body, as shown by the Discovery of Human Remains buried in Peat in the Zetland Islands.* By James Hunt, Ph.D., F.S.A., F.A.S.L., Hon. For. Sec. of the Roy. Soc. of Literature of Great Britain, For. Assoc. of the Anthrop. Soc. of Paris, Hon. Fellow of the Ethnol. Soc. of London, Cor. Mem. of the Upper Hesse Soc. for Nat. and Med. Science, and of the Med. Assoc. at Hesse Darmstadt, Mem. of the Dresden Academy, and President of the Anthrop. Soc. of London.

While opening recently a tumulus in the Island of Brassay, one of the Zetland group, I heard from a lad that he had come on some wooden coffins in digging the peat a few hundred yards from the tumulus. On examining the place, I certainly found pieces of rough boards, together with some dry wooden material. There was nothing to indicate that these rough boards had ever been coffins. Another piece of wood projected from the peat, and I decided to make an exploration of the place. The Rev. Dr. Hamilton, who lives in the manse, about half a mile from the spot, assured me that they could not be coffins, and he did not think the subject worth investigating.

On exposing the pieces of wood projecting from the peat, I found the same sort of pieces of wood as had before been turned up. There were no traces of animal remains in this case, nor any sign of any wooden fabric. If it had ever been a coffin, the top had fallen in, as well as the sides.

While engaged in digging up the one marked A, in company with Mr. Petrie, the workman's spade came in contact with a stone, which I took of him, and at once exclaimed, "here are some markings." Mr. Petrie came up, and pronounced the mark to be an anchor, when the fact that we had come upon a sailor's grave at once suggested itself. Whilst we were examining

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the stone, the spade came against another stone, which we removed carefully, and Mr. Petrie at once pronounced it "to be a palm-branch rune."*

Both stones had the inscriptions downwards. After taking off about twelve inches more peat, we came upon a shell, that had all the appearance of having been a coffin. This was the first perfect box we had found, but it was quite empty, with the exception of a fatty substance at the bottom.

We resumed our labours in the hope of finding other inscriptions; but although we saw just the same sort of stones in all directions, we had not the good fortune to find any other inscriptions. Dr. Hamilton was with us most of the time, and he contended that these were not really coffins, but the remains of wooden boxes made in the shape of coffins, in which smugglers had buried their treasure. He explained the broken boxes by supposing them to have been opened to take out the treasure, and the presence of woollen fabric as the remains of bags in which the money or treasure had been kept, and the markings on stones as something by which the position of these long boxes might be known. He explained the fact of the so-called coffin, in which we had found the inscriptions, being in a perfect state, by supposing that this box had been empty, and the stones it had not been necessary to touch. Besides this, Dr. Hamilton assured us that there was a well-known tradition in the Zetland islands of men having come to the islands, and under pretence of burying some of their crew, were in fact concealing treasure, which they were known to have come back afterwards to dig up. They had thus temporarily hidden their treasure in coffin-shaped boxes to avoid suspicion. We heard also a vague tradition that a Russian vessel had come into the bay, having the plague on board, and that three of the crew who died had been buried on the spot where we were digging. Another tradition was that some people who had died in Lerwick, of leprosy, had been buried here. Both these traditions were, however, very vague, and even the cottagers in the neighbour-

* The inscriptions on these stones are figured in the next paper.

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hood had never heard of either of them. Dr. Hamilton kindly made inquiries of all the principal old people in the island, but could elicit no satisfactory information. Under these circumstances, we were obliged to acknowledge that Dr. Hamilton's explanation was so far satisfactory, with the exception of slight traces of a fatty deposit at the bottom of one of the coffins, and even this was not found until we had opened several of these boxes. In examining this substance, Dr. Hamilton himself came upon a perfect human finger-nail,—that now produced. His hypothesis, up to this minute, had done very well; but on the discovery of the finger-nail, I was induced to advocate a more natural explanation of this absence of animal remains.

In the discussion which had been going on, it had been suggested that peat had a tendency to preserve the human body; but to this Dr. Mitchell objected that this was not always the case, and that bone especially was often destroyed by the acid in the peat. And here it may be interesting to give a few instances of the preservation of the human body in peat, for it becomes of the greatest importance to understand that varieties of peat may so entirely differ in their chemical components as to have entirely opposite effects. In the *Philosophical Transactions* (vol. iii, p. 1734), there is an interesting account of the dead bodies of a man and woman which had been preserved for forty-nine years on the moor in Derbyshire, by Dr. Charles Balguy, of Peterborough:—

"The persons of whom you have the following account were lost in a great snow-storm on the moors, in the parish of Hope, near the woodlands, in Derbyshire, January 14, 1674, and not being found till 3rd of May following (the snow lasting probably the greatest part of that time), they then smelt so strong that the coroner ordered them to be buried on the spot. The man's name was Barber.

"They lay in the peat-moss twenty-eight years nine months before they were looked at again; they were found not very altered, the colour of their skin being fair and natural. In the year 1716, Dr. Bourn, of Chesterfield, gave me this account of the condition they were in; viz., the man was perfect, his

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beard strong, and about a quarter of an inch long, the hair of his head short, his skin hard, and of a tanned leather-colour, pretty much the same as the liquor they lay in. The woman, by some rude person, had been taken out of the ground, to which one may well impute her greater decay. . . . Mr. Barber, of Rotherham, the man's grandson, was at the expense of a decent funeral for them at last, in Hope Church, where, upon looking into the grave some time afterwards, it was found that they were entirely consumed.

Dr. Rennie, writing in 1810, says, "In the year 1773, in a turf-bog in Ireland, some wooden bowls, with arrow-heads, two or three sacks full of nuts, and a coat of very ancient texture, were dug up fifteen feet below the surface."

"The horns, hoofs, and bones of animals have been detected in moss, in a state of perfect preservation. . . . Dr. Percy, Bishop of Dromore, says, 'that the horns of an animal of uncommon size are found in the turf-bogs of Ireland. Dr. Walker was of opinion that this species belonged to an animal of the deer kind, which is not known to exist at present anywhere on the globe. That this animal was once a native of Ireland, and the elk of Scotland, is evident from the remains which have been found in peat-turf; nay, whole skeletons of animals, the existence of which is as remote, have been found deep in moss.'" At another place he remarks,* "Even the softer parts of animals are found in a high state of preservation, though sunk deep in moss. . . . Dr. Walker mentions that two human bodies, which had been buried in moss for nine years, were found unconsumed at the expiration of that period. . . . Some bodies were dug up in Ards moss, in Ayrshire, which had lain for a much longer period, even since the persecution of the Covenanters in the reign of Charles II.

"There is reason to believe that a human being may be preserved for ages innumerable if buried deep in moss. In June 1749, the body of a woman was found, six feet deep, in a peat-mire, in the Isle of Axholm, in Lincolnshire. The

* *Essay on the Natural History and Origin of Peat-Moss*, by the Rev. Dr. Rennie, Edinb., 1810, p. 517, and *loc. cit.* p. 520.

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antique sandals on her feet showed that she had been buried there for many ages; yet her nails and hair were as fresh as any person living. . . . In a turbary on the estate of the Earl of Moira,* in Ireland, a human body was dug up, a foot deep in gravel, covered with eleven feet of moss. The body was completely clothed, and the garments seemed all to be made of hair. It would appear that this body had been buried at an early period; yet it was fresh and unimpaired. It is unnecessary to add, that the bodies of other animals have been found in a state of equal preservation in moss. . . . The above instances are sufficient to show that peat-moss is possessed of a powerful antiseptic quality."

In the *Morgenblatt* of January 1858, there is an interesting article, giving the following account of preservation in peat:— "At Falun, in Sweden, a miner was dug out who had been, for fifty years, lain in the ground, impregnated with copper solutions. His bride, then seventy years old, immediately recognised him, so well was he preserved. It is well known that animal bodies are well preserved in peat. Many corpses have been found so preserved in the peat-moss of Ireland, Jütland, and Friesland. About thirty years since, there was found in the peat, near Haraldskjör, a female body in a mummified state, fastened by a hook to a stake, and covered with rich gold ornaments. This, according to the archæologists, was the body of Queen Gunhilde, of Norway, who, in the year 965, had been sunk into a peat-bog as a punishment for her infidelity to the king. Some bodies were found dressed in skins, with sandals on their feet, which testifies to their antiquity. It is, in fact, a natural chemical process for the preservation of animal matter."

Many other instances might be cited in proof of the preservative power of peat, but I am not aware of any recorded cases of its destructive qualities. We have to consider whether it was the acid in the peat, or the action of the water which

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* A full account relative to this body, by the Countess of Moira, read before the Archæological Society, May 1, 1783, will be found in *Archæologia*, vol. vii.

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had so completely destroyed these human bodies; but of twelve coffins found, we got only a nail from one, part of an under jaw, a long bone from another, and a few teeth from a third. This was, however, sufficient evidence to prove that they were really coffins, and that the bodies had been almost entirely destroyed.

I examined the whole locality for coffins, and the last that could be found was opened in the presence of several friends from Lerwick; it turned out to be the most interesting we had yet discovered. Situated rather lower in the peat than the remainder, when we came on it the top appeared more solid, and we soon found it was filled with water, and we proceeded to make a drain and let the water out from the bottom, so as to be able carefully to examine the contents of the coffin. Before letting out the water we observed, on taking up the lid, that a body apparently pretty perfect remained for us. I preserved a portion of the water for chemical analysis. In cleaning the skull and the long bones I found considerable difficulty, and also in separating the skin and muscles of the arm from the bone. I had an easy task in scalping the long-sought for treasure, and found that with one grip I had a pretty good wig in my hand.

When the men who dug up this coffin saw the contents, they could not be got to render any further assistance, and declared that the sight and smell had turned their "inside out;" this was, however, purely the effect of imagination. It was with some difficulty I could get them to bring some clean water to me, and to deposit it at some yards distant. I had gone to Lerwick for a packing-case, and the sailors who brought me over hesitated to take back a skeleton, but an offer of a little extra coin of the realm, quite satisfied their consciences.

This coffin was about six feet six inches long, and was made of thicker wood than any of the others. The next in thickness was the one in which the stones with inscriptions were found. In the coffin now under description, we were somewhat surprised to see two pieces of dry peat. Mr. Umfray, of Reawick, made inquiries for me as to this custom, and he was told

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by a carpenter that it was quite common to put peat at the foot of a coffin if it had been made too long. The bones of the leg measure respectively,—femur, 17⅞ inches, tibia, 13⅞ in., and this would give, on the usual computation, a height of only about 5 feet 11 inches; thus, the coffin being six feet six inches, the necessity for the peat will be at once seen. There is nothing particularly remarkable about the skull. It measures 7⅜ inches by 5⅝ inches, the cranial index being ·76. The grave-digger in Hamlet says "water is a sore decayer of the human body;" but in this case we see that water, holding in solution certain chemical acids, rather acts as a preventive to decay. This coffin was, to all intents and purposes, hermetically sealed. It was quite full of water, being made of better and thicker wood than the other coffins,—had not the same liability to dry up when the peat dries. The fact, too, of being buried at a greater depth than the other coffins, would make it less liable to atmospherical influences. With regard to the woollen fabric, I could get no two persons to agree as to whether it was of Zetland make or foreign. In one of the coffins we found some what I believe to be wooden buttons, but what were called by some wooden beads. An act of Parliament, ordering that all persons should thenceforth be buried in flannel,—for the good, no doubt, of the flannel trade,—may possibly explain the presence of the woollen fabric.

The wood of which these coffins was composed varied very much in quality and thickness, some being very rough, and little more than bark; while in other boards of the thick coffins there was clearly visible the marks of the saw. All the coffins were of the same material, viz., Norway pine, apparently as fresh as the day in which it was felled. There appeared to be marks of iron nails. We saw the mark of nails, but no fragment remained.

The only explanation I can offer of the absence of all human remains in most of the coffins, is the supposition that the bodies had either been destroyed by the water or acid in the peat, but it was more likely to have been the acid, for the one full of water had the whole body pretty complete. This coffin, once filled with water, would continue to remain full

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and with the same water; while the others would be continually receiving fresh supplies of water impregnated with acid, and thus all traces of the body and bone would in time vanish.

With regard to the age at which these remains were interred, there seems nothing to induce the supposition that they were at all ancient. The best evidence, too, that they were not very recent, is the fact that there is a little cluster of rude Zetland cottages not two hundred yards distant, and that not "the oldest inhabitant" had the faintest idea that there had ever been anyone buried in this place. They all accepted Dr. Hamilton's explanation, that these long wooden boxes had been buried with treasure. The close proximity of this place, too, with the town of Lerwick, would render it nearly impossible for this to have been used as a graveyard within at all recent times, without some account having been preserved of it. The Rev. Dr. Hamilton has promised to make further inquiries for me from both the people of Brassay Island and Lerwick. For the present, therefore, I have thought it best simply to record the facts without speculating as to their date. How far the inscriptions found in them may help to determine their date is another question. It is, however, just possible that this may not have been the original place of these stones.

In conclusion, I may here state that, in another part of the same island (Brassay), I opened two other graves. These two were both close together in the side of a hill, about a mile south of those before described. I only found coffins with the top and sides having fallen in as before. At the Ness, near Reawick, I also opened the grave of a sailor, who was buried about ninety years ago. In this case there was no coffin, and in digging we merely came on a greasy substance. I turned this over carefully, and underneath was revealed the countenance of a man, with the under jaw having fallen. It was not altogether a pleasant picture, and one turn of the spade effaced all traces of the feature from the dark oily-looking peat.

I have thought it worth while to record these facts. They

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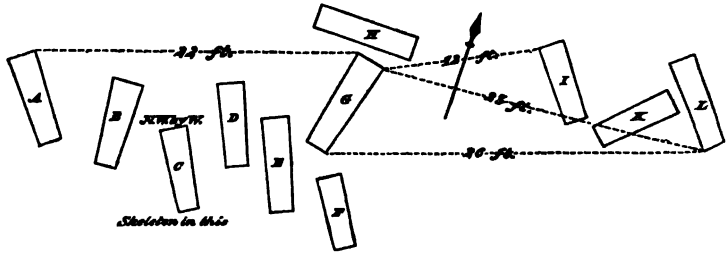
open up interesting facts to the historical anthropologist. I believe that a distinguished naturalist, Sir William Jardine, is investigating this very subject, and we may hope ere long to have some most interesting and important conclusions from him. In the meantime, I think we shall all do well to record any facts of a similar description that may come under our observation; and we may in this manner be able eventually to predict, with some certainty, as to the description of peat in which these human bodies or skeletons are likely to be best preserved.



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XXVIII.—*On the Interpretation of some Inscriptions on Stones Recently Discovered in the Islands of Brassay, and Zetland.* By James Hunt, Ph.D., F.S.A., F.A..S.L., Hon. For. Sec. of the Roy. Soc. of Literature of Great Britain, For. Assoc. of the Anthrop. Soc. of Paris, Hon. Fellow of the Ethnol. Soc. of London, Cor. Mem. of the Upper Hesse Soc. for Nat. and Med. Science, and of the Med. Assoc. at Hesse Darmstadt, Member of the Dresden Academy, and President of the Anthrop. Soc. of London.

Having described the position in which the stones now exhibited were found, I need only now dwell on the interpretation of the artificial markings found on them. I do this, not because I am able to offer a satisfactory solution of the difficulty, but simply to record the information I have gained from Runic and other scholars on this point.

I have before mentioned that Mr. George Petrie, of Orkney, was with me when they were found, and I afterwards inspected, with that gentleman, the large number of Runic characters in James Maes How, Orkney, so well described by Mr. Farrar and Mr. Stewart. The result, however, of my inspection was not sufficient to decide that the characters were runes, and I therefore put myself in communication with the chief runic scholars in Europe, and obtained the following opinions.

Dr. Edward Charlton, of Newcastle, who is favourably known as interpreter of the Maes How inscriptions, wrote me:—"The marks that you send me from Brassay are exceedingly interesting, but I fear they will give us no clue to their design. The

looks more like a compound rune than it resembles a mason's mark. Had there been a large building in the place where

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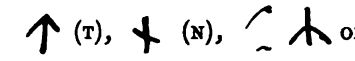
you found it, we might have suspected the latter. The letters in the runic alphabet, of which it may be composed, are

 (T), (N), or (YE).

Had the stroke denoting N been only absent, we might have made a pleasant theory, that it was the name Tyi, one of the Asæ, or gods, which had been put upon the stone, and this would apply still better if the stone were found in a cairn or place of sepulture. The other mark

looks like an Ogham, and would answer to the third letter of the third division of the Scandinavian alphabet, or Futhork, the letter B. You will be aware that there already exists on the Island of Brassay a fine carved stone, with a most remarkable Ogham inscription, of the date of about the year 800, or perhaps earlier. I trust that we shall find more Runic inscriptions yet in Shetland. The interiors of the great caves, or 'Helyers,' on the seashore have not yet been explored; the magnesium light may help us to do this more completely than has as yet been done."

The Rev. Dr. Barclay, Principal of the University of Glasgow, next sent me the following communication:—"On my return from the Highlands last night, I found your letter of the 19th, enclosing a drawing of the two inscriptions on the stones found by you on the Island of Brassay. You say nothing about the spot on which they were found,—whether they were in juxtaposition, or whether there were any traces of human remains near them. I infer they could not have been far asunder, as the two inscriptions are identical in meaning, although varying a little in form. They are not *lim* (branch runes, on which each tree forms only one letter; see *Explanation of Maes How Inscriptions*). They are cut in a very uncommon species of *bind* (combined) runes, of which only two other specimens have hitherto been discovered, as far as I am aware. The peculiarity consists in the characters

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being arranged around a *perpendicular* line essential to the formation of each of them, and requiring to be read *downwards* from the apex to the base. Each of your inscriptions gives very distinctly the proper name *Teit* or *Tait*, it may be either. That name is a very common one in the northern Sagas; it is the very first that occurs in the Orkney Maes How inscriptions, and it continues to the present day widely diffused throughout the Shetland Islands."

I then wrote to Principal Barclay, and told him the exact position in which they were found. I had purposely refrained from doing this to any of my correspondents, as I thought we should be more likely to get at a correct interpretation of these markings by withholding this information. After receipt of the foregoing letter, however, I gave him the information for which he asked, and received the following in reply:—

"I am not a little surprised to learn from your note of the 30th ult., that the inscribed stones were found in connexion with a *wooden* coffin, and that it was one of twelve deposited in the same peat moss. You do not say whether any bones or ashes were found in these coffins. Had bodies been buried in them, the antiseptic qualities of the moss should have acted still more powerfully on them than on the wood. As far as the Runic incriptions are concerned, your information tends to confirm my reading of them. They undoubtedly record the name of the person buried in the coffin on which the stones were placed. As to the *date*, we know that Runic inscriptions, recording at least the name of the deceased, were in use long after the introduction of Christianity, notwithstanding the zeal of the first Christian missionaries in destroying as many of them as they could, till the *old* religion was wholly extirpated. Whether your friend 'Tait' was a pagan or a Christian it is hard to say; but his *epitaph* cannot, I think, be less than six or seven hundred years old."

Professor George Stephens, of Copenhagen, who is probably the highest authority in Europe on Runes, has kindly given me his opinion in the following communication:—

"I shall be happy if I can be of any service, however small. It is a great pleasure to me to receive copies of inscribed

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monuments, particularly when they are more or less Runic. I only hope that all such monuments will be carefully studied and protected.

"The circumstances under which carved stones are found is, of course, a necessary element in their discussion. Unfortunately, you have forgotten to mention how and where they were found, and whether they are old or new, large or small. In the absence of these details, I presuppose that they are tolerably large, and *slabs* (not massive standing blocks), and that they, both of them, have been found in or near, or have come from some old churchyard. Viewing them in this light, I should take these to be burial-stones. The figures on them I judge not to be Runes, properly so called, but Runic bomarks. As the Runes died away, they were followed by monograms, or marks, variously made up of Roman or Runic letters. These are found everywhere, from very early times; and many such are well known, and have been frequently engraved under the name 'masons' marks,' 'swan marks,' 'house marks,' etc. But they were used on all sorts of objects, tools, buildings, seals, stones, to show ownership of fields, or how far each farmer had to mend the roads, and so on. There is no reason why the Brassay stones found by yourself should not be—if small—such roadside stones, carved long ago by peasants. But I have said that such Runic monograms are found on grave-stones. I will give one example out of many. I have just returned from an antiquarian excursion in the beautiful and interesting Danish Island of Bornholm. Just outside the church door of Svanike, I found a large slab, apparently from the sixteenth century. But a great part of the old inscription had been chiselled out, and a new risting had been made, dated 1622. The lower part consisted of a similar bind-rune, as follows:—

SVANIKE, Bornholm, Denmark.

As to other objects, in my own cabinet is an old counter, or

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plaything, or ornament, of copper. The other side has a

nearly similar carving. As to seals, thousands still exist in original or in impressions, from the close of the middle age and still later, especially in Scandinavia, with such Runic or half-Runic monograms. I will add an impression from one—a very fine one—of bronze, in my own museum; this has been a signet-ring, evidently intended for the little finger.

Of course we can seldom or never make out these arbitrary marks. No real monograms can be understood, save by the maker and his family or friends. If we take IAMES (or JAMES) HUNT, and write— ᛇᚺ or ᛁᚺ, in Runes ✱, (= ᛁ and ✱), no one can possibly know what we mean, so many are the combinations possible; nor even if we add the last letter, T,— ᛇᚺ, or ᛁᚺ, or in Runes ✱, shall we be any the wiser.

"The Brassay stones may be a couple of centuries old, or even much more antique. As to their age, much will depend on their character and size, etc. Pardon me that I cannot forward you anything more decisive and satisfactory."

After sending Professor Stephens all the information I had then obtained, I received the following from him :—

"The details you there give are valuable. On the whole, it is possible that the remains were, after all, those of Russians, and the marks may not be runes at all. At all events, the coffins are signs of Christian burial. May not the one carving be *an anchor*, in connexion with the dead, being part of a ship's crew? The other may have some other such simple signification. But I confess that I am at fault, and can give no clear opinion. Certain it is that they have nothing to do with the Ogham stone you mention, which must be at least 1,200 or 1,500 years *older* than the small blocks. The Ogham stones are Keltic, and heathen.

"Diggings have lately been made, under the inspection and at the expense of the Danish Museum, in the famous moss at Allesö, Fyn. An immense hoard of antiquarian remains has

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been taken out, date about the fourth century after Christ. A bone comb bears an inscription in old northern Runes. Still more striking is a plane (a common carpenter's plane), which bears three old northern Runic inscriptions, forty-four letters in all. They are scribbles, such as we find in any workman's shop at the present moment. But they are decisive as to the fact that these workmen were *northmen*, and that the bulk of the tools, ornaments, and weapons found is also northern, not Roman, as indeed the style and workmanship at once testify. There is something very *piquant* in a plane from the workshop of one of our forefathers, 1,500 years ago!"

Dr. George Moore, of Hastings, writes to me thus:—"Presuming that the figures were inscribed on the stone, with their branches turned downwards, they may certainly be both read as monograms formed of several Scandinavian or Norwegian Runic characters united. The more sprig-like figure represents, in fact, the same characters as the other, but in a less elaborate style,—so to say, in running-hand, the more formal figures having been cut, and the ruder one scratched in. Regarding them as originally standing in a direction opposite that indicated, it does not appear that they could be read as consisting either of Runic or Ogham characters, and, indeed, they could only be considered as fanciful landmarks. The rounded extremities of the branches, as in the more finished figure, occur also in Runic inscriptions found in England; as for instance, that discovered at a depth of twenty feet, on the natural ground level, in St. Paul's Churchyard. This was a Runic grave-stone of the eleventh century, according to C. C. Rafn, in his remarks on this stone, published in Copenhagen, 1854.

"Reading the figures as having their branches pointing downwards, they both make the same word,—DANY or DANR, the final Y being pronounced R (Rafn). We may, therefore, suppose the stones to have been erected to indicate the conquest or possession of the spot by Danes. It is possible that the figures bore a religious symbolic meaning, and were inscribed to the honour of *Dan*, who, according to Safo Grammaticus and others, was believed to be the patriarch king and

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founder of the Danish kingdom in very ancient times; and there is reason to believe that he was not only the legendary hero, but that he was also worshipped as the patron deity of the early Danes. I shall be glad to hear if you obtain any more satisfactory explanation of these odd Runes."

Mr. W. S. W. Vaux considers that these are builders' marks, such as are common on Norman stonework.

Dr. Pruner-Bey says—"Phœnicia and its colonies have preoccupied me for years in my quality as an oriental scholar. My favourite guide for reading inscriptions is Levy (at Breslau). But I am at a loss to see more in the inclosed drawings than perhaps a seal on pottery.

might be Siz (town), Sous (house)?

But all are very doubtful."

Dr. Charnock considers them to be surnames;—viz., *Dad* or *Tat*, and *Dadda* or *Tatta*; which he compares with the Anglo-Saxon names *Tata, Tate;* Old Saxon, *Tato, Tatto;* Old German, *Dado;* Old Norske, *Teitr;* English, *Tate, Tait, Dadd.*

The foregoing is all the information I have been able to obtain on this subject. It is, however, somewhat singular that out of the hundred islands composing the Zetland group, the Island of Brassay should be the only one in which any form of inscribed stones have been found. A beautiful specimen of an inscribed stone, found by Dr. Hamilton, is now deposited in the Museum of Scottish Antiquities; and I am glad to be able to announce that the stones which I had the good fortune to find will all be deposited in the same national collection. We do this in the hope and expectation that the Scottish museum will deposit, with us, objects which we more especially wish to collect, viz., ancient crania.

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XXIX.—*The History of Ancient Slavery.* By John Bowie, D.C.L. (Oxon.), Barrister-at-Law.

> "Homo sum, humani nihil a me alienum puto."
> Terence, *Heauton.* 1, l. 25.

The states of freedom and slavery have been coexistent from a very early period of the world's history. The curse pronounced by Noah on his grandson Canaan, the youngest of the four sons of Ham (B.C. 2347), is the first recorded instance of slavery that is to be found. "Cursed be Canaan; a servant of servants shall he be unto his brethren. Blessed be the Lord God of Shem; and Canaan shall be his servant. God shall enlarge Japheth, and he shall dwell in the tents of Shem; and Canaan shall be his servant" (Gen. ix, 25-27, B.C. 2348). Nimrod (the rebel, as his name implies) was the son of Cush, Ham's eldest son, and it is related "that he was a mighty hunter before the Lord" (Gen. x, 8, 9, B. C. 1998); and it seems to have been universally inferred that he was the first slave-taker. Pope says of him,—

> "Proud Nimrod first the bloody chase began,
> Almighty hunter, and his prey was man."

At all events, we read that Abram (B.C. 1913) had three hundred and eighteen servants, or slaves, born in his house and trained to arms, with whom he pursued and conquered the four kings who had taken captive Lot, his brother's son (Gen. xiv, 13-15); and it would seem that both Abram and the king of Sodom considered the prisoners taken as part of the spoil, because the king of Sodom says,—"Give me the *persons*, and take the goods to thyself." About sixteen years after this, we find Sarah saying to Abraham, of Hagar and her son Ishmael, "Cast out this bondwoman and her son: for the son of this bondwoman shall not be heir with my son, even

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with Isaac" (Gen. xxi, 10); and St. Paul makes Isaac a general type of freedom, and Ishmael a general type of bondage (Rom. ix). Indeed, throughout the entire sacred history we invariably find servants classed, among their masters' property, with flocks and herds.

The first recorded account we have of slave-dealing is in the year 1729 B. C., when Joseph was sold to the Ishmaelites for twenty pieces of silver (Gen. xxxvii, 27, 28); and it is, perhaps, worthy of remark that the first slave-traders should have been the descendants of Ishmael, whose progenitor was the *second* person upon whom we learn that the ban of slavery was passed, Canaan having been the first.

About 1491 B. C., we find slavery pervading all the Hebrew political economy, and regulated by a code of divine laws (see Levit. xxv, 39, *et seq.*). It appears also that some Israelites were sold when they had committed theft, for which they could not make restitution (Exod. xxii, 3).

All Hebrew servants were to be released at the sabbatical year, or after six years service (Deut. xv. 12); for the entire seventh year appears to have been a year of freedom (Exod. xxi, 2-26; Jer. xxxiv, 14); but if such a servant then refused his freedom, his ear was pierced with an awl, and he afterwards remained his master's property as absolutely as if he had been a heathen (Levit. xix, 13).

Such is a brief summary of the institution and law of slavery among the Hebrews. If not directly appointed by God himself, yet as he has sanctioned it by giving a divine law for its regulation, it seems impossible to resist the conclusion that it was, in its inception, a divine institution. But the divine law was not in any way abrogated by the Christian dispensation. Of this (Matt. xviii) distinct proof is given in our Saviour's parable of the two debtors; and also in the Epistle written by St. Paul to Philemon, on behalf of his runaway slave, Onesimus. St. Paul entreats Philemon for the freedom of Onesimus by almost every variety of argument: 1st. on account of Philemon's reputation for goodness; 2nd, the respect due for his own character; 3rd, his friendship for St. Paul; 4th, the reverence due to St. Paul's age; 5th, the

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compassion due to his bonds; 6th, Onesimus's repentance and conversion to Christianity; 7th, the tender interest St. Paul took in his concerns; 8th, a promise of restitution for pecuniary loss; and 9th, a gently urged insinuation that Philemon was himself indebted to St. Paul for much more than the freedom of his repentant slave, even his own conversion to Christianity. All is submitted to Philemon's own generosity, and Onesimus was sent back to his master as the bearer of the Epistle written in his behalf. Neither any law of the Christian dispensation, nor even the apostolical authority, is urged in behalf of Onesimus's *right to freedom by virtue of the Christian Dispensation.*

About A.D. 189, we find Titus Flavius Clemens, commonly called Clemens Alexandrinus (because he was generally supposed to have been born in Alexandria, although he was more probably born at Athens), and other Gentile writers who had embraced Christianity, urging that slaves should be treated on the golden rule of doing to others as we would be done by, but not urging any argument on the subject of a Christian right to freedom.

At Cecropia,—so called from Cecrops, who founded it about B.C. 1556, and taking the name of Athens, about two hundred years later, from Αθηνη, the protectress of the city,—we find that slavery prevailed concurrently in point of time with the same institution under the Hebrews, and was certainly in full force at the time of the Trojan war, B.C. 1184. Homer, who probably wrote in the ninth century before Christ, mentions Cyrus and Egypt as about this time the common marts for slaves (*Odys.* xvii, 448). Tyre and Sidon, as we learn from the book of Joel (iii, 3, 4, 6, B.C. 800), were notorious for the prosecution of this trade; for it is there said of them "The children of Judah and the children of Jerusalem have ye sold unto the Grecians, that ye might remove them from their border." And the prophet Ezekiel (xxvii, 13, B.C. 588) says, "Javan (or Greece) *Tubal* and *Meshech** traded the persons of

* Tubal and Mesech are said by some commentators of the present day to be Tobolsk and Moscow, both in the Russian empire.

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men and vessels of brass in thy market" (Ezek. iii, 27-41); and in the first book of Maccabees (B.C. 144) we read that when Antiochus was about to attack Judah and Jerusalem, "The merchants of the country, hearing the fame of them, took silver and gold very much, with servants, and came into the camp to buy the children of Israel for slaves."

I now propose to cull the general details of the system from the copious literature of Greece and and Rome, and then to glance at it among more modern nations.

The descriptive appellation of the Greek freeman was ελευθερος; of the slave, δουλος; the Roman freeman was *liber;* the slave, *servus;* while in both states there was an intermediate caste, called among the Greeks απελευθερος or μετοικος, and among the Romans *libertus* or *libertinus.*

The Greek philosophers never seem to have considered slavery as at all repugnant to their very high sense of public morality, although a slave was reckoned by them as a mere living machine and possession. Aristotle (who was born about 384 B.C.) calls a slave in one place εμψυχον οργανον (*Ethic.,* VIII, 13), and in another place, κτημα τι εμψυχον (*Polit.* I, 4); and Plato, who was born about forty-six years earlier (B.C. 430), as well as Aristotle (*De Rep.,* V, 469), seem to maintain that slavery is perfectly right when barbarians only are made slaves, but that no Greek should be held in slavery by a Greek. It is singular to remark that heathens should have drawn for themselves the same distinction which had been settled by a divine law for the Hebrews; and we shall by and by observe that the resemblance to the Hebrew law is even still more striking in the Roman empire.

It has generally been considered that there were two kinds of slavery among the Greeks,—those taken in war, and those that were purchased. The δοριαλωτοι, however, as a class, do not seem to have been fairly reckoned among the δουλοι. When a victorious tribe laid claim to the territory which their spear had won, the majority of the vanquished used still to live on, and cultivate the land which had been wrested from them, and paid a certain rent to their conquerors. They were also called upon to do military service with their masters.

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They could not be separated from their families, nor sold, and they had the right to acquire property for themselves. Of this class, as mentioned in *Cosmi* (p. 294), were the Helots of Sparta, the Penestæ of Thessaly, the Bithynians at Byzantium, the Caliegrii at Syracuse, and the Amphamiotæ at Crete. Their original right of tenure was wrested from them by the law of conquest, and their having passed *υπο ζυγου* may be considered equivalent to the giving up of arms at the present day; but instead of having forced upon them the usual characteristics of a state of slavery, they seem rather to have held their land only under a different tenure, resembling very much, in its main features, the old feudal tenures of this country. The general political state of Greece, too, in its early history, was the same as that of Europe when divided by the feudal system into an infinite number of small and dependent kingdoms. There was the same matter, therefore, for contention, and the same call for all hands that could be mustered; and as all retainers were bound to do military service at all times, and for that purpose must have been armed, it does not seem probable that they could have been subject to the ordinary discipline of slaves: as a general rule, slaves who were the subjects of purchase were never armed; and I shall by and by notice the only three exceptions to this rule, two of which were in the Greek, and the third in the Roman empire.

The other class had about them all the distinctive marks of slaves (Plato, 300, B.C. 436). They were subjects of sale. Isocrates calls them *αργυρωνητοι* and *χρυσωνητοι*. They were entirely the property of their masters, were employed for domestic purposes, and could be bought and sold like any other goods and chattels. In Athens, Corinth, and other large cities, this class of slaves was considerable, and they performed the work of artizans and manufacturers of modern towns (A.D. 200, Athenagoras, 6 p. 264 c.). In smaller towns, such as Phocis and Locris, there were said to have been originally no domestic slaves (Clinton, *F. H.*, II, p. 211, 212). The majority of slaves were males; and cohabitation was not encouraged, because it was considered cheaper to purchase than to rear

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them. A purchased slave was called *οικετης*, and one born in the house, *οικοτριψ*,—that is, one both of whose parents were slaves, *αμφιδουλοι*; and the child of *οικοτριβες* was *οικοτριβαιος*.

It was a recognised rule of Greek national law that the persons of those who were taken prisoners in war, became the property of the conqueror, but it was the practice of the Greeks to give liberty to those of their own nation on payment of a ransom (B.C. 450, *Xen. Cyrop.*, VII, 5, 73); consequently the slaves in Greece were almost all barbarians. From a passage in Timæus (*Ap. Athen.*, VI, p. 2650, B.C. 400) it would seem that the Chians were the first who carried on the slave trade, where Thucydides describes the slaves as more numerous in comparison with the free inhabitants than at any other place, except Sparta (Thuc. VIII, 40, B.C. 469). Herodotus (lib. c., B.C. 484) tells us, that in the early ages of Greece a a great number of slaves were kidnapped by pirates on the coast; but the chief supply appears to have come from the Greek colonies in Asia Minor, the inhabitants of which had abundant opportunities of obtaining them from their own neighbourhood and the interior of Asia. Some also came from Thrace, where parents not unfrequently sold their own children. Thucydides also tells us (lib. I), "the Grecians in their primitive state, as well as the contemporary barbarians who inhabited the seacoasts and islands, addicted themselves wholly to piracy; it was, in short, their only possession and support," and this piracy was always accompanied by a taking of slaves.

At Athens, there was a regular slave market, called *κυκλος*, —a name suggestive of the order in which the slaves were placed for inspection and sale. They were also sometimes sold by auction, as is now done in the American states, and were placed for that purpose upon a stone called the *πρατης λιθος*, seller-stone.

The prices of slaves varied considerably. Xenophon, in his *Memorabilia*, speaks of one who was sold for a talent (£343 : 15*s*.); while some sold for as little as half a mina (£2 : 9*s*.). The knowledge of any art greatly increased their value; and hence we find that of the thirty-two sword cutlers who belonged to the father of Demosthenes the price varied

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from six to three minæ (£25 to £12 : 10*s.*). Female musicians (players on the *cithara*,—*lyra**) were usually worth from twenty to thirty minæ (£80 to £120).

The number of slaves in Athens at the time when the census was taken, Demetrius Phalereus then being archon (B.C. 309), appears so large that the correctness of the figures has been doubted by very high authorities. From the census made, it appears that there were 400,000 slaves to 21,000 free citizens, and 10,000 metirs, and it has been thought 40,000 should be read for 400,000 (Niebuhr, ii, p. 69, *note* 143). Probably, however, the numbers of the census were correct, because there is no doubt that the slave population in Attica was much larger than the free; and it must be remembered that in taking the census the object was to ascertain, among the *freemen*, the males only who were fit for political and military service; while of *slaves*, as property, the whole body of individuals would, most probably, be reckoned.

There were at Athens large bodies of slaves who were purchased by the state. They were employed as heralds, check clerks, etc., and some of them filled subordinate places in the assemblies and courts of justice. They were instructed in the discharge of their duties at the expense of the state. Another class formed the city-guard, who were generally Scythians, and armed with bows. They were at first only 300, but after the battle of Salamis, were increased to 1,200.

At Athens, even the poorest citizen had a slave for the care of his household; and in large establishments they were employed for all domestic purposes,—bakers, cooks, tailors, carpenters, etc. Plato says some persons had fifty domestic slaves or more (*De Rep.* IX, p. 578). In mines and

* Nothing has been a subject of greater controversy than the number of strings attached to these lyres. Hermes, who is said to have been originally the inventor of the instrument (Diodorus I, 16, tells us) had only three strings,—one with an acute, one with a grave, and one with a middle sound. It would draw us too far from our subject to enter into this controversy, and therefore I would only mention that Terpander, of Antissa (about 650 B.C.), added to the number of four strings with which the lyre was then strung, three additional ones, making the entire number seven.

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manufactures they were employed in still greater numbers; and Nicias had 1,000 slaves in his mines alone. In Rome, slaves were used almost entirely, by private persons, for the purposes of luxury; while in Athens they were employed for the purposes of trade. Many kept large gangs of slaves for the purpose of letting them out for hire, and found this a profitable investment for their capital. In the mines, slaves were let at an obolus ($\frac{3}{4}d.$) a day, while leather workers produced two or three oboli; and it seems Demosthenes reaped about 20 per cent. by his investment in sword-cutlers. Sometimes it appears that slaves worked on their own account, and when they did so, they paid their masters a certain sum a day.

As slaves were often in the habit of running away, it seems that Antigenes of Rhodes set up an insurance office against runaways, and for eight drachmas (6*s.* 6*d.*) per annum insured the value of a slave who might in this way make his escape.

At the battles of Marathon and Argineusæ (B.C. 490, Pausan. I, 32), the Athenians armed their slaves (*Schol. Aristp.* III); as a general rule, however, they did not serve in the army. (*Ranæ,* XXXIII.) Slaves differed in no respect from all other tangible property, and were given and taken as pledges, as well as bought and sold. The state also imposed a tax on them after the rate of three oboli ($2\frac{1}{2}d.$) for each slave. The Greek slaves enjoyed universally much more liberty than those of Rome, and at Athens this was most particularly the case; indeed, on the reception of a new slave into a household there, (fifth century B.C., Aristoph. *Plut.* 768) they used to scatter *καταχοσματα, bons-bons,* in the same manner as at a wedding. Their lives and persons were also protected by law; and not only could they not be put to death without a legal sentence, but a person who struck or maltreated a slave was liable to an action. They had also the temple of Theseus (A.D. 200, 7 Julius Pollux, 13) as a place of refuge from their masters, and on reaching that sanctuary they might insist on being sold by him. They were, however, subject to corporal punishment, which was the *ultima ratio* in the case of a freeman; nor were they believed on their oaths, but were always put to the torture. But from this circumstance, their evidence was always

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considered of more weight than that of a freeman, for Isæus remarks (B.C. 350, *De Arop. Hered.*, 202), "When slaves and freemen are at hand, you do not make use of the testimony of freemen; but putting slaves to the torture, you thus endeavour to find out the truth of what has been done." Demosthenes (B.C. 380) and other orators bear like testimony on this subject. Athens and Egypt (in which latter country the temple of Hercules was the sanctuary of slaves) were the only places where, if we except the cities of the Jews, they were treated with any humanity at all.

Manumission was by no means common at Athens; and it seems very doubtful whether a slave could, against his master's consent, purchase his own freedom. Manumitted slaves did not, as at Rome, become citizens, but only *απελευθεροι* or *μετοικοι*; nor does it appear that the children of such, *απελευθεροι* were freemen. Their *quasi* freedom still required them to honour their former master as their patron, and to perform certain duties towards him, the neglect of which subjected them to be again sold into slavery. History does not furnish us with the mode of manumission adopted; but this will not be wondered at when it is remembered that the number of slaves, according to the census before quoted, was 400,000, while of *απελευθεροι* or *μετοικοι* it was only 10,000.

The particulars which we have gleaned of slavery in Greece, have been furnished almost entirely from the literature of the fifth century before Christ. In the remarks which we have to make on slavery within the Roman empire, we shall cull a few details from authors who wrote in the first century before and the first century after Christ, or from what, by a little latitude of expression, may be called the literature of the Augustan æra;* and with these we must unavoidably mix up

* B. C.
150. Plautus.
106. Cicero.
65. Horace.
43. Cæsar.
43. Ovid.
42. Val. Maximus.
40. Livy.

A. D.
12. Propertius.
34. Persius.
50. Martial.
50. Strabo.
60. Pliny.
100. Tacitus.
120. Suetonius.

A. D.
130 Gellius.
150 Apuleius.
150 Juvenal.
250 Dionys. Cassius.
260 Athenæus.
483 Justinian.

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the institutes of Justinian, although not compiled till the fifth century after Christ.

Justinian (lib. I. c. 5), following older jurists, says, the power of making slaves is esteemed a right of nations, and follows as a natural consequence of captivity in war. He says they are called "mancipia quasi manucapti." The civilians generally say that a conqueror was entitled to the life of his captive, and, having spared that for a while, he may take it when he pleases.

A Roman master could sell his slave, punish him, and even put him to death. As this absolute power was carried to great excess, we find that by the *lex Petronia*, probably passed in the time of Augustus, a master was not allowed to deliver up his slave to fight with wild beasts without first taking him before the judex, who might condemn him so to fight if he appeared to deserve it. And we also find that, by a constitution of Antoninus (A.D. 138), which applied not only to Roman citizens but to all who were under the Romanum Imperium, that if a man put his slave to death *sine causâ*, he was liable to the same penalty as if he had killed another man's slave. The constitution of Claudius II (A.D. 250) is still more favourable to slaves, as it declares that if slaves were put to death, the act should be murder; and also, that members of the same family, if sold, should not be separated.

A slave could not marry, nor could he have any property, but whatever he acquired was the property of his master; and when a slave took under a will, both real and personal estate went for the benefit of his master. At Rome, as in Greece, slaves were employed not only in agricultural and domestic labours, but also as mechanics and artizans in every branch of industry. To the industrious slaves, a *custom* arose of allowing a small *peculium* (vail), although by strict law the utmost farthing belonged to the master. With these *peculia*, slaves were in the habit of buying their own freedom (Tacit., *Ann.*, 24, 42), and if a slave were manumitted by his master, the *peculium*, unless expressly retained by the master, was always considered to become the property of the slave along with his freedom. A master, also, was liable for the *delicta* of his slave,

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and if the master refused to pay the damages recovered, he was obliged to give up the slave.

The name of *servus* appears to be derived from *servare*, to keep or to save, and perhaps may have been given originally from the fact that *servi* were those who had been saved by their conquerors from death in battle. Our name of slaves probably comes from the people Slavi, as it appears that the tribes from the north, when Rome was invaded, brought with them their own slaves, who were chiefly Slavonians. The Slavonians, indeed, seem to have been an unfortunate race; for so late as A.D. 800, Charlemagne devoted the whole race to perpetual imprisonment.* A slave born in a family was called *verna*. At Rome, the approach to freedom both as regards birth and manumission was, in many respects, more accessible than in Greece. Justinian (I, 4) tells us, that a person was born free (*ingenuus*) if one parent were *libertinus* and the other *ingenuus*; and also, that if a woman conceived as *ancilla*, and was *liberta* at the time the child was born, or if she conceived as *libera* and at the time of birth had become *ancilla*, that the child should be free born. A slave taken in war was a slave *jure gentium*, and a born slave was such *jure civili*. But besides the born slaves and those taken in war, Roman freemen might become slaves by various laws. Those, for instance, who evaded military service; a man who allowed himself to be sold as a slave in order to defraud the purchaser, and a freewoman who cohabited with a slave; and also, under the the empire (Gaius, 28, lib. I, s. 8), persons condemned to death, to the mines, and to fight with wild beasts, lost their freedom, and their property was confiscated. By the law of the Twelve Tables, if a freedman died intestate and without *sui hæredes*, the patronus was his heir (Ulp. *Frag.*, XI, 3, 29, 2). As a

* (Gibbon, vol. ix, 300.) It seems worthy of remark that the name *Slave* (for it ought not to be spelled with a *c*) in the Slavonian dialect means "glory;" and singular enough it is that not only the people themselves should have become "inglorious," but that their national name should also have been adopted for the description of the most "inglorious" class of all the people of the earth. And it is still more singular that a kindred race, called Σκλαβοι in Greek, and in Latin *servi*, should also have become slaves; so that in the Latin tongue they would be slaves both by name and nature.

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liberta (as mother) could not have heirs of her own, the patron always took as heir. If a freedman made a will, he could pass over his patron, whether he had *sui hæredes* or not, and might adopt a stranger in that capacity. In order to remedy this, an edict of the prætor was passed, by which if a freedman died testate, leaving his patron nothing, or less than half his *successio*, the patron might have *possessio bonorum contra tabulas* of one-half, unless the *institutus* was the testator's natural child; and if a freedman died intestate, leaving none but *adoptivi filii* as *sui hæredes*, the patron was still entitled to one-half. By the *lex papia poppœa*, the patron took an equal share with natural children, when any freedman died either testate or intestate, leaving fewer than three children, and a sum of 1,000 aurei (Guas). By the code of Justinian, when a freedman died testate, worth less than 100 aurei, the patron took only the sum bequeathed to him; but if he died possessed of more than that sum, the patron might claim one-third, provided the freedman had no natural children. When the freedman died intestate, the patron succeeded only as under the Twelve Tables, and never came in with any child of the deceased.

Perhaps it is not inconvenient here to make just a passing remark on what the Twelve Tables really were; and it may be stated in a few words that they comprised originally the whole body of Roman *civil* law, the equivalent of our present common law. The Greek republics had a civil law of a very like nature; and for the purposes of Roman government, a body of ten commissioners were appointed to revise and codify the civil law of the Greek republics. These commissioners were called the *decemviri;* and the result of their revision and codification was shown by the laws of the Twelve Tables, so called because they were engraved on twelve tables of brass. These laws were afterwards added to by the *novellæ*, or edicts of the emperors, and the *Senatus Consulta* and *Plebiscita*, acts almost exactly corresponding with those of our House of Lords and House of Commons.

There was a body of public slaves at Rome, who seem to have been regarded in a more favourable light than private

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slaves, as they had, along with the *liberti*, the power of making wills. They were employed (Tacit., *Hist.*, I, 43) to take care of the public buildings, and to attend upon magistrates and priests. The ædes (ædes of Ceres) and quæstors (tax-collectors) had great numbers at their command; and so also had the triumviri nocturni, to prevent fires. They were employed also as lictors, jailors, executioners, and watermen. We have before observed that the Greeks, after the battle of Salamis, increased their military slaves from three hundred to one thousand two hundred; in like manner the Romans, after the battle of Cannæ, purchased eight thousand slaves for the army, who were afterwards manumitted for their bravery.

Gladiators seem to have formed a class of slaves of themselves. They were trained in bodies by their masters, who were called *lanistæ*. The first exhibition of them at Rome (Val. Max., II, 4, 7) was in the year 264 B.C., when Marcus and Decimus Brutus employed them at the funeral of their father (Liv. *Epist.*, 16). For some they were employed at public funerals only, but afterwards fought at the funerals of all persons of distinction (Suet. *Juv.*, 26), and even at those of women. They were armed with swords, and used to fight in the amphitheatre, and other public places of amusement of the Roman people. Under the empire, the passion of the Romans rose to its greatest height for this amusement, and they were employed on many public and private occasions, as well as at funerals. After Trajan's triumph (A.D. 100) over the Dacians,—more than three hundred years after their first introduction,—upwards of 10,000 were exhibited at once (Dion. Cas., 55, 15). In the year B.C. 73, they rose against their oppressors, and defeated a consular army (Livy, *Epist.*, 97); and two years later, were subdued only after 60,000 of them had been slain. They were finally suppressed by Honorius about A.D. 400.

Large gangs of slaves were for a long time employed by private persons in the cultivation of land; while even persons in good circumstances do not appear to have had more than one to wait upon them (Plin., *H. N.*, 33, s. 1, 6). Cato, when he went to Spain as consul, took only three slaves with him.

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During the later times of the republic, however, and under the empire (B.C. 170), slaves appear to have been employed in great numbers in all domestic offices, and the want of these was considered a reproach (M. Pison, 27). Cicero, describing the meanness of Piso's housekeeping, says, "Idem coquus, idem atriensis, pistor domi nullus." Juvenal (III, 141) also says, a question commonly asked was "Quot pascit servos;" and Horace (*Sat.*, I, 3, 12) ridicules Tullius for being attended only by five slaves, while he considered that every person in tolerable circumstances ought to keep at least ten. Wealth and luxury, in the days of the republic, greatly augmented the number of domestic slaves. Athenæus says (VI, p. 272), that many Romans possessed 10,000, and some as many as 20,000 slaves (A.D. 260); but although there is probably some exaggeration in this, it is quite clear that a freedman under Augustus (Pliny, XXXIII, s. 10, 47) left at his death as many as 4,116. Horace says (*Sat.*, I, 3, 11) that two hundred was no uncommon number, and that Augustus permitted a person who was exiled to take twenty slaves along with him.

The chief means by which the Roman slaves were obtained were war and piracy; and during the constant wars of the republic, we find the numbers of them increasing in proportion to the victories obtained by the Roman arms. Slave-dealers usually accompanied an army, and frequently, after a great battle had been gained, many thousands were sold at once. In the camp of Lucullus (B.C. 70), on one occasion, slaves were sold at four drachmæ each (9¾*d.* = 3*s.* 3*d.*). After the fall of Corinth and Carthage, Delos was the chief mart for that kind of traffic. Strabo says (A.D. 50), the Sicilian pirates, when in possession of the Mediterranean, sold as many as 10,000 slaves in one day. The principal supply, however, came from Phrygia, Lycia, Cappadocia, and other Asiatic countries. Not unfrequently very large fortunes were realised from the sale of slaves; but those who dealt in them, *mangones*, were called *venalicii* (tradesmen) and not *mercatores*, and it is quite clear that they were not considered to hold the position of Roman gentlemen; and although Cicero (*De Off.*, lib. I, c. 42) does not specifically mention slave-dealing as among the

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"quæstus qui in odia hominum incurrunt," yet there is no doubt he would consider it "illiberalis et sordidus."

At Rome, as at Athens, slaves were frequently sold by auction; hence Cicero's expression (M. Pison., 15), "homo de lapide emptus," on this stone, or a platform called *castata*, they appear to have been raised (Perseus, VI, 77) in order to afford purchasers an opportunity of minute inspection. They were stripped naked, for the purpose of defeating the tricks of the dealers, who were apparently as crafty in their dealings as horse-jockeys at the present day. Slaves of extraordinary beauty, or possessing any other great qualifications, were shown in private, and not exhibited in the public market. The slave-market was under the direction of the ædiles, and they made many regulations respecting it. Like the warranty of a horse now (Gell., 4, 2), the slave for sale had a scroll of his character hung round his neck (Propert., IV, 5, 51), by which the seller was bound; if a false account was given, he was compelled to take him back within six months from the time of sale, or to make good the deficiency to the buyer. The general terms of warranty were as to health, freedom from epilepsy, honesty, not running away, nor having a tendency to commit suicide. The newest imported slaves were generally most sought after, while the impudence of the *vernæ* had become so proverbial as to make them of the least value in the market. The price of slaves at Rome varied as much as it did at Athens. Eunuchs always fetched a high price; and Martial (III, 62) speaks of beautiful boys fetching as much as 10,000 (£885 : 8 : 4) to 20,000 (£1770 : 16 : 8) sesterces each. He also speaks of a *morio*, or fool, bringing 20,000 sesterces. Literary men and doctors also fetched a high price; and slaves fitted for the stage, as we learn from Cicero's oration on behalf of Quintius Roscius, as much as sixty minæ (£240); a good-looking prostitute, also, on account of the gain to be made by her master, used to sell for a like sum. A fair price for a good ordinary slave was about 500 drachmæ (£18). In the time of Justinian, the legal valuation of slaves ranged from 20 to 70 solidi (Guas), according to age and qualifications. Previous to his time, female slaves had been much cheaper, unless they

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fetched an extra price on account of their beauty; so that we find in Martial's (VI, 66) time, a slave girl of indifferent character was only worth about 600 sestertii (£5).*

Private slaves were divided into urban and rustic, as pointing out their different places of occupation; the former probably employed in attendance on their masters, and the latter in agricultural pursuits. Domestic slaves were also divided into many different grades or castes, and held a position according to the nature of their occupations. The different classes were called *ordinarii, vulgares, mediastini,* and *quales-quales.*

The *ordinarii* were stewards, bailiffs, or butlers, and were such as the master placed confidence in; they also had other slaves (Cic., *ad Attic.,* XI, 1) under them to assist in the despatch of the work over which they had the superintendence. The *vulgares* were general domestic servants, and perhaps might be described according to the nature of their duties, as bakers, cooks, confectioners, etc.; under this class, also, were included the porters, bedchamber slaves, and litter-bearers. The *mediastini* seem to resemble the Indian servants who wait, answering to the call of *qui-hi*; the scholiast upon Horace, *Epist.,* I, 14, 14, defines them as "qui in medio stant

* Illustrative of state-revenue produced by the sale of slaves, the following extract is made from Napoleon the Third's *History of Julius Cæsar,* vol. ii, p. 595:—"The immensity of his resources is explained by the circumstance that, independently of the tribute paid by the vanquished,—which amounted for Gaul to 40,000,000 sestertii a year (more than 7,500,000 francs, or £300,000,)—the sale of prisoners to Roman traders produced enormous sums. Cicero informs us that he gained 12,000,000 sestertii from the captives sold after the unimportant siege of Pindenissus. If we suppose that their number amounted to 12,000, this sum would represent 1,000 sestertii a-head. Now, in spite of Cæsar's generosity in often restoring the captives to the conquered people, or in making gifts of them to his soldiers, as was the case after the siege of Alesia, we may admit that 500,000 Gauls, Germans, or Britons, were sold as slaves during the eight years of the war in Gaul, which must have produced a sum of about 500,000,000 sestertii, or about 95,000,000 francs, or £3,800,000. It was thus the Roman money given by the slave-dealers, which formed the greatest part of the booty; in the same manner as in modern times, when in distant expeditions the European nations take possession of the foreign custom-houses to pay the cost of war, it is still European money which forms the advance for the costs."

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ad quævis imperata parati." The *quales-quales* were the lowest class, but their peculiar line of duties does not appear to have been very clearly pointed out, but we are safe in assuming that the dirtiest and most servile offices fell to their lot. Besides the division just given, there were the literati, who appear to have formed a class of themselves, and were employed as secretaries or amanuenses. Another description of slaves was called *vicarii;* they seem to have been of the class *ordinarii,* and as the *vicarii* were subject to a peculium from their masters, they may from this have acquired the name of vicarii, as, *pro tanto,* being the representatives of their masters. The appointment of vicarii was mere matter of private convenience, and might be revoked at any time.

In early times, slaves were treated with more indulgence, and more like members of the master's family; they joined their masters in worship to the gods, and sat at meals with them on subsellia. They had a regular allowance of *far,* oil, and salt. The usual allowance of far was a pound a day; and Cato (B.C. 70) allowed his slaves a *sextarius* (pint) of oil a month, and a *modius* (gallon) of salt a year; at the Saturnalia and Competalia they had an additional allowance of food, with a small quantity of wine.

The offences of slaves were severely punished. They were worked in chains and flogged, and hung up by their hands with weights suspended to their feet. Mistresses (Ov. *Amor.,* I, 14, 15) were frequently as severe in their punishments as masters (Mart., 2, 66), and a straggling hair or an untied string used to call down summary punishment (Juv. 6, 498). This was inflicted by an instrument called a *flagrum,* which was a whip with three knotted thongs. These *flagra* were sometimes placed in the hands of professed floggers called *lorarii* (A.D. 150), and instead of the knots, they were sometimes strung with *tali* (Apuleius Met., 8) from the legs of sheep, pastern bones (small bone adjoining) the foot, sometimes used as dice, the effect of punishment with it was not unfrequently fatal. That it was always severe, you may be sure, because it is the instrument which Bellona and the Furies are always represented as holding. To the houses of many who

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kept a large body of slaves were attached subterraneous prisons called *ergastula*. Juvenal (*Sat.* 14-24) speaks of one of these as "carcer rusticus," so that probably they were principally used in the country. Slaves were confined in them in chains, (Plin., 18, 7,) and when brought out of them to work, they worked in chains. According to Plutarch, who had visited Rome (A.D. 120), these prisons arose in consequence of the conquest of Italy by the Romans, and the great number of barbarous slaves who were employed to cultivate the conquered lands. They were finally abolished by Hadrian (A.D. 100) as being liable to great abuse (Spart.) in the hands of tyrannical masters.

Runaway slaves could not be lawfully received or harboured, (Hadrian, 18; Gaius, 1, 33) to conceal them was "furtum." The master was entitled to pursue them wherever they went, and it was the duty of all authorities to give him aid. Various laws were passed to prevent slaves running away, and consequently a runaway could not legally be an object of sale. A class of people called *fugitivarii* made it their business to recover runaway slaves, so that we may readily understand the number was not inconsiderable.

Before referring to the mode of manumission, perhaps it is convenient to notice that there were three classes of *liberti*,—the *Civis Romanus*, the *Latinus*, and the *Dediticius*. The two former will be treated of in their proper order in speaking of manumission. The *dediticii* were those who in former times had taken up arms against the Roman people, and, being conquered, had surrendered themselves. By conquest, their relation to Rome became that of subjects, and as has been before observed of the δορεαλωτοι of Greece, they held a state, at all events, higher than that of slaves. The Lex Ælia Sentia also provided, if a slave were manumitted at any time after he had been put in bonds by his master as a punishment, or branded, or put to the torture for an offence and convicted, or delivered up to fight with wild beasts, or sent into a "ludus gladiatorius," (Gaius, 1, 13,) or put in confinement (Ulp. *Frag.*, tit. 1, sec. 11), that he should not acquire the state of a "Civis Romanus," nor even of "Latinus," but only that of a "dediticius." The

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class were considered freedmen, and not slaves, but they had no independent political rights.

Justinian (Lib. 1, 6) mentions many modes of manumission "aut ex sacris constitutionibus in sacrosanctis ecclesiis aut vindicta, aut inter amicos, aut per epistolam, aut per testamentum, aut aliam quamlibet ultimam voluntatem." There is also the mode by census mentioned by Gaius and Ulpian (A.D. 220).

The manumission by Vindicta was probably the most ancient as well as the most usual. It was also the method pointed out by law and conferred absolute irrevocable freedom. The slave was brought before the magistrate (Plaut. *Mid.* IV, 1, 15), and the lictor laying the vindicta or festuca (stalk or stem) upon him declared him free ex jure quintium (Pers. 5, 175), whereupon the master who had meantime held the slave said, "*hunc* hominem liberum volo," and then let him go "e manu emisit." The manumission "ex sacris constitutionibus," or as it has been otherwise called, "sacrorum causâ," seems to point only to the grounds of manumission, as the form might be in the usual manner.

The modes "inter amicos," or "per epistolam," which are mentioned by Gaius as well as Justinian, did not confer legal freedom, but were mere expressions of the master's wish, which he might at any time recall until the more formal mode by vindicta had been adopted. The Lex Juliana Norbana, however, gave the prætor the power of protecting persons who had been so made free and they acquired the state called Latinitas, which has been just mentioned, and which might be enlarged into the state of "Civitas" by marriage, and a compliance with the terms imposed by the Ælia Scutia (Gaius I, 30, 66).

There was also a manumission by census. If a master on the taking of a census allowed his slave to return himself as a freedman he was thenceforth free, or at least became so on the celebration of the lustrum or purification of the people which was always performed by one of the censors in the Campus Martius after the usual quinquennial taking of the census. The last mode of manumission was by "Testament" or any expression of the deceased's last wish on the subject. By this

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method freedom appears to have been conferred in a manner as perfect by the vindicta. The power of so conferring it was, however, for some time limited by the Lex Puria, and varied from one-half to one-fifth of the entire number which the master possessed. This law was afterwards repealed by Justinian. In speaking of the absolute freedom conferred by the manumission by Vindicta and Testamentum, it is not meant that slaves so freed became liberi or ingenui, for they only became liberti or libertini—freedman not freeman—and their late master still stood to them in the relation of patronus—and when the freedom was conferred by will, the patronal rights devolved on the children of the testator—Gaius, indeed, states that all slaves who were manumitted in the proper form and under the proper legal conditions became complete Roman citizens—and Justinian, as we have before seen, calls the children of liberti ingenui. But the term ingenuus it is apprehended was introduced for the purpose of indicating only a citizen by birth, one in gente natus, and has not the same meaning as Gentilis, which as Cicero tells us, Scævola, the pontifix, defined to be, one who bears the same name, is born from ingenui, none of whose ancestors had been a slave, and who had suffered no "capitis diminutio," that is one, none of whose family had been attainted of crime. The sons of libertini, who were by law ingenui, still continued subject to the patronal authority (Gens, Genus, kindred); and although they had the right of voting and bore the *Gentile* name of the manumittor as a prefix to their own, yet Horace (*Serm.* 1, 6, 46) tells us they were often taunted with their servile origin in his day (65 B.C.) Shortly, however, after the Emperor Justinian had compiled his Institutes, he, by a novella or edict, put an end to all the previous distinctions that had been in use as to the degrees of freedom, and declared every manumitted slave absolutely ingenuus—nay he even conferred on them the right of wearing gold rings, a privilege which had always before formed a distinctive mark of the nobles and knights.

A tax was levied on manumission, which amounted to one-twentieth part of the value of the slave, and was thence called Vicesima (Liv. 7, 16, Cic. ad Attic. 2, 16).

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Freedom was also a frequent subject of purchase from the State during the time of the first Emperors, by persons who had not been slaves, but by foreigners, and more especially Jews, who were anxious to become Roman citizens. And thus we find in the 21st and 22nd ch. of Acts, v. 27, 28, that when St. Paul was brought before the chief captain at Jerusalem, the chief captain "asked him if he were a Roman, and he said Yea. And the chief captain answered with a great sum obtained I this freedom—And Paul said but I was free-born."

Slaves were allowed the rights of burial, because as the Romans regarded slavery as a mere social institution, they considered that death put an end to the distinction between slaves and freemen. We find that they were sometimes buried in the same tomb with their masters. A master was compelled to bury his slave; and if a man buried the slave of another he had a right of action against the master for the expenses of the funeral.

Of slavery among other nations little is known. Tacitus, indeed, who wrote about A.D. 100, tells us (*De Mor. Germ.* 24, 25) that among the Germans slaves were generally attached to the soil and employed in agriculture—that as a general rule they could not be sold, beaten, chained, or imprisoned, and therefore, perhaps, as has been before remarked of the Greek captives taken in war, they may be considered to have been under a feudal rather than under a slave discipline. If, however, a German, as was not at all unusual, staked his freedom on a cast of the dice and lost, he then became a subject of sale like any other chattel.

In Africa, perhaps, both in ancient and modern times, slavery has ever been marked by the strongest and most disgusting features (Cæsar *de Bel. Jugurth.*, c. 91); and it would appear that it prevailed there from the first peopling of that unexplored country. On the coast of Guinea a great trade in slaves was carried on by the Arabs some hundred years before the Portuguese embarked in that traffick. In 651 the Mahomedan Arabs of Egypt so harassed the King of Ethiopia that he agreed to send them annually by way of tribute a vast number of Nubian slaves into Egypt.

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As a concluding remark, it may be added that up to the present day the black and white species cannot contract marriages with each other except under the penalty of barrenness in the third generation at farthest, thus proving that the Divine institution of a difference between the two races still continues to exist. This same law seems to prevail in regard to many other human species. For information on this subject see Bollaert's *Introduction to the Anthropology of the New World* in the present volume. In opposition to his views, however, I feel fully convinced that the entire human species sprung from the first man, Adam, and that the inferiority of race arose from the curse passed on Canaan, followed up by the subsequent curses to which I have before only briefly alluded.

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XXX.—*Blood-Relationship in Marriage considered in its Influence upon the Offspring.* By Arthur Mitchell, A.M., M.D., F.R.S.E., F.A.S.L., etc., Deputy Commissioner in Lunacy for Scotland.

A series of quotations might easily be given to show that there exists a remarkable difference of opinion as to the influence which consanguinity in the parentage exercises upon the offspring.

Further,—such a series of quotations could not be made, on anything like an extended scale, without finding that Scotland is pointed at as occupying a peculiar position in relation to the subject.

The voice of the people in this country, whatever its practice may do, condemns blood-alliances, and declares them to be productive of evil. Educated and uneducated may be said to entertain this belief equally; and as every one has considerable opportunities of testing its accuracy by personal observation and experience, the probability of its being simply and wholly a traditional error becomes small. Even among professional men, there is scarcely less unanimity in this general condemnation. But their wider knowledge and habits of closer observation lead often to qualifications and doubts; while occasionally we find an investigator wholly denying the evil, and characterising the dread of such unions as "a superstitious fear".

If we carefully study the literature of the subject we shall find that it abounds in unsupported assertion, and that important conclusions are very often made to rest on a basis which is undefined or clearly too narrow. Yet, somehow, in spite of this, we rise from such a study with little doubt as to the reality of some evil effect, though we may feel strongly that its character and its measure are not well-known, and that of the nature of those conditions by which it is evidently modified we are still very ignorant.

Both general and professional opinions on this subject rest, in no small degree, on a peculiar and faulty kind of evidence. When we are presented with the question,—"Does consanguinity in parentage appear to injure the offspring?" memory searches for instances of unions of kinship, from the history of which the answer is to be framed. Now, it is certain that all

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those which have been marked by misfortune will be first called up, while many of those which have exhibited no evil effect or no peculiarity of any sort will be passed over or forgotten. The attention, in all likelihood, has been frequently drawn to the first, while nothing may have occurred in the progress of the last to keep alive the recollection of relationship in the union. I need scarcely say that facts collected in this manner are almost sure to lead to inferences beyond the truth, yet it is from such data that conclusions on this subject have frequently, if not usually, been drawn.

During the course of 1860, I collected some evidence of this character myself. It embraces the history, more or less complete, of 45 cases. They belong chiefly to one district of Scotland, and are nearly all from the upper and middle classes of society. Without exception, every case communicated to me during the period of my inquiry is included; my informants were intelligent and observing men, and their statements I believe to be substantially correct. The result I give below:—

In 8 cases no evil result was observed.

In 8 cases sterility (virtual or actual) followed.

The 29 cases which remain gave,—

8 Idiots.
5 Imbeciles.
11 Insane (mania, melancholia, dementia, etc.)
2 Epileptics.
4 Paralytics.
2 Deaf-mutes.
3 Blind (congenital?)
2 With defective vision.
3 Deformed (spinal curvature, etc.).
6 Lame (character of lameness not given).
1 Rachitic.
22 Phthisical, scrofulous, or manifestly of weak constitution.

My notes show 146 as the total number of children born of these 45 unions, but I think it improbable that this is correct, as several of the marriages were very prolific, and as I have reason to think that in some cases my information related only to the defective.

Nothing would more certainly be unsound than deductions from these figures. Without intention, they are actually selected cases, and it would be a pure accident if they were found to embody *the rule*. I am certain that I could easily find in Scotland 45 marriages, where no kinship existed, which would exhibit in the offspring even a sadder picture. Though it is

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just possible that in the particular instances before us the unsound condition of the children was largely due to the consanguinity of their parents, yet it is quite certain that from such data alone we cannot correctly determine the measure of the evil influence which such consanguinity exercises on the average. By a selection of cases a false power might, in like manner, be given to any of the other causes of such calamities. There, however, the selection would be forced, *and the forcing apparent;* while here it is natural, unacknowledged, and undesignedly made, but not the less real on that account.

There is another kind of evidence which has been largely used in discussions on this subject, and which is somewhat allied to that of which I have been speaking, though even more likely than it to lead to error. Startling illustrations of calamitous sequences to cousin-marriages have been detailed, and pointed at with a finger of warning, *the relation of cause and effect being assumed.* Such a *relation* may have existed, but it is equally possible that it may not, for it must always be remembered that a blood-alliance between the parents is far from being *the only cause* of defective offspring.

Supposing the proof complete that it is *a cause,* it is still only one of many, and we cannot therefore point with confidence to a particular case, and say positively, that the calamity there is due to consanguinity of parentage, for it may really be due to injuries in parturition, to hooping-cough, to a blow on the head, or to starvation in infancy. Consanguinity in the parents *may* very decidedly *tend* to injure the offspring, yet it by no means follows that every defect in the children born of blood-related parents is an expression of this tendency, for the general causes of defect will exist among them as among other children, and will give results at least equally disastrous. It is clear, therefore, that isolated cases cannot be used in this or in any similar question to indicate the measure of the evil which may be expected, or even *to prove its existence.* The minute examination of individual cases is far from valueless, but they cannot be adduced to teach the rule in this matter.

In the 45 cases already alluded to, there occur some of as startling a character, I think, as any which I have ever seen recorded. It would be difficult, for instance, to imagine a

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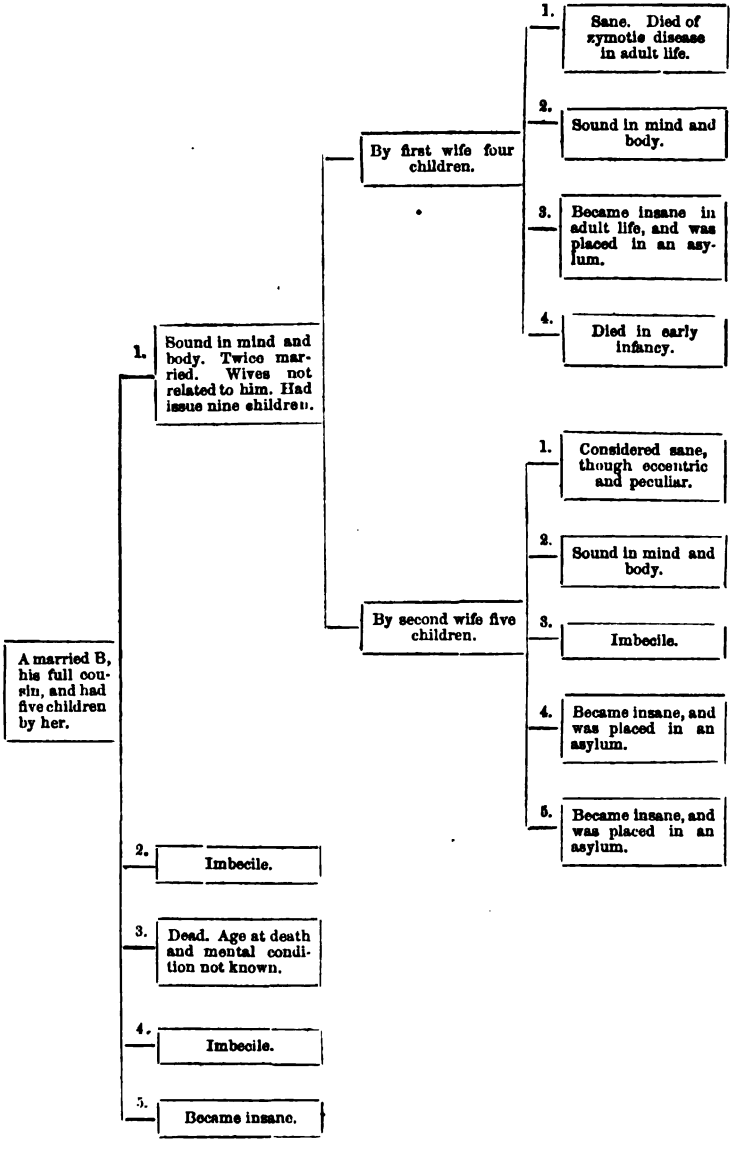
greater intensification of one form of mischief than occurs in the following case, which I represent diagrammatically in order to make it more easily understood :—

CASE I.


A married B, his full cousin, and had five children by her.
1. Sound in mind and body. Twice married. Wives not related to him. Had issue nine children.
By first wife four children.
1. Sane. Died of zymotic disease in adult life.
2. Sound in mind and body.
3. Became insane in adult life, and was placed in an asylum.
4. Died in early infancy.
By second wife five children.
1. Considered sane, though eccentric and peculiar.
2. Sound in mind and body.
3. Imbecile.
4. Became insane, and was placed in an asylum.
5. Became insane, and was placed in an asylum.
2. Imbecile.
3. Dead. Age at death and mental condition not known.
4. Imbecile.
5. Became insane.

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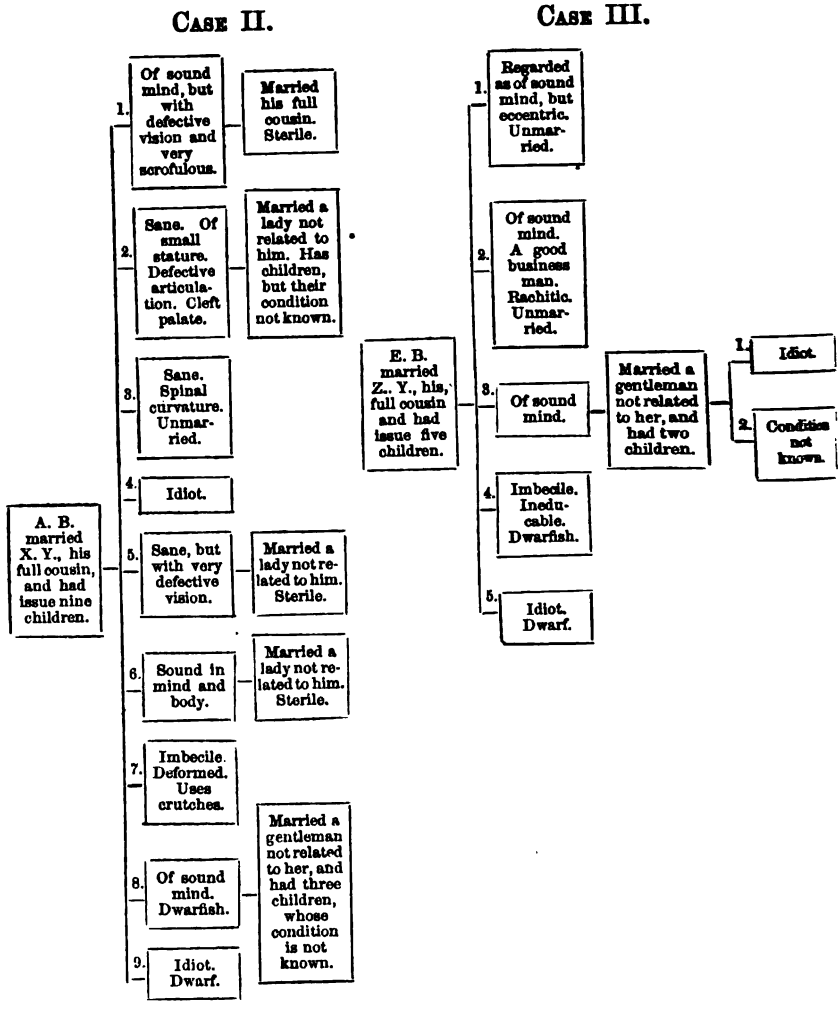
If it be possible to conceive a family history more melancholy than that presented in the foregoing diagram, we shall find it in the cases which follow.


Case II.
Case III.
A. B. married X. Y., his full cousin, and had issue nine children.
1. Of sound mind, but with defective vision and very scrofulous.
Married his full cousin. Sterile.
2. Sane. Of small stature. Defective articulation. Cleft palate.
Married a lady not related to him. Has children, but their condition not known.
3. Sane. Spinal curvature. Unmarried.
4. Idiot.
5. Sane, but with very defective vision.
Married a lady not related to him. Sterile.
6. Sound in mind and body.
Married a lady not related to him. Sterile.
7. Imbecile. Deformed. Uses crutches.
8. Of sound mind. Dwarfish.
Married a gentleman not related to her, and had three children, whose condition is not known.
9. Idiot. Dwarf.
E. B. married Z. Y., his full cousin and had issue five children.
1. Regarded as of sound mind, but eccentric. Unmarried.
2. Of sound mind. A good business man. Rachitic. Unmarried.
3. Of sound mind.
Married a gentleman not related to her, and had two children.
1. Idiot.
2. Condition not known.
4. Imbecile. Ineducable. Dwarfish.
5. Idiot. Dwarf.

As differing somewhat from the foregoing, but still revealing a great amount of family misfortune, I subjoin the history of other two unions of consanguinity.

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CASE IV.—M. married F., his cousin, and had issue five children, of whom one was sane, one was paralytic, one was lame, and two were idiotic.

CASE V.—M. married F., his cousin, and had issue ten children, of whom two were sane and had arrived at maturity, one was an idiot, one was an imbecile, one was deaf and dumb, and five died in early infancy.

When I resolved to attempt the investigation of this subject, I felt a perfect indifference as to whether I should be led to the conclusion that a blood-relationship between the parents did *much*, or *little*, or *no* injury to the offspring, and I have endeavoured to conduct the inquiry without prejudice. The result is, that I have convinced myself that it does injure the offspring, and I shall by-and-by detail, as fairly and fully as I can, all the facts on which this conviction is founded. My object in now stating the general conclusion at which I have arrived is to enable me to make the foregoing cases the text of some comments, the introduction of which at this stage of my paper will be convenient. Besides, it does not appear to me that it would serve any good purpose to avoid the indication of this conclusion till after the facts are stated on which it rests.

I have said already, that it would be unphilosophical to found a belief even in the existence of an evil done to children by a blood-relationship between their parents on such evidence as the detail of a few startling cases like the five which precede, and that it would be still more unphilosophical to look to such evidence for the teaching of a rule in the question. For, in actual fact, we know that however viewed, these are most exceptional cases; and, what is more, we also know that it would be easy to set off against them cases quite as deplorable in their character, where the most careful inquiry has failed in detecting any kinship among the progenitors of the defective children for generations back.

Yet, this minute examination of individual cases has its use. For instance, it leads us to suspect that the evil may sometimes not manifest itself in the immediate offspring of such unions, yet may do so in the grandchildren and great-grandchildren. Cases I, II, and III, all appear to show this, and it has been

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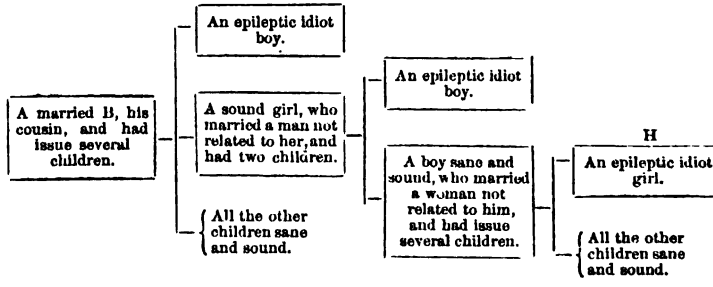
observed in scores of other instances. Sometimes, indeed, a defect has been found to occur, which at first sight appeared purely due to hereditary transmission, or to be without explanation in the history of the ascendants, yet which, on a close investigation presented itself as the possible transmission or manifestation of an evil which had originated remotely in a union of kinship. There is thus reason to suspect that in the seemingly sound children of blood-related parents a *potential* defect may exist and may eventually manifest itself as *actual* defect in their offspring. If this be real, we are led to the inference, that even the most careful estimate of the measure of the evil under examination may prove erroneous, since defects originating in these marriages may appear eventually in society as hereditary tendencies, and it may scarcely be possible, in a particular instance, to speak otherwise of the defect than as a manifestation of an inherited proclivity.

The following case, perhaps, better illustrates these remarks than those I have already given. I must beg, however, that it be remembered that it is given merely in illustration, and not as proof. Absolute, stateable, proof of such views can scarcely be given, yet they may be fair and sound conclusions from actual observation in a wide field—of such probable accuracy, at least, as to make it prudent in us to shape our conduct by them.

CASE VI.


A married B, his cousin, and had issue several children.
An epileptic idiot boy.
A sound girl, who married a man not related to her, and had two children.
All the other children sane and sound.
An epileptic idiot boy.
A boy sane and sound, who married a woman not related to him, and had issue several children.
H
An epileptic idiot girl.
All the other children sane and sound.

The parents of the epileptic idiot girl H were not blood-related, nor were her grandparents, but her great-grandparents were cousins, and in their children, grandchildren, and great-grandchildren, epilepsy had appeared, though it had never done so in any of the collateral branches of their family.

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It occurs to me here to remark, that a single form of defect often occurs either in one generation, or in successive generations. This form may be epileptic idiocy, as in the last case, or uncomplicated mental disease, as in Case I, or deaf-mutism, blindness, deformity, club-foot, hare-lip, etc., as in many other cases which have come under observation, but which it would be impossible here to detail. Cases II, III, and IV, on the other hand, illustrate the combination of mental and physical defects, and afford an interesting manifestation of sterility. It is, of course, more usual to have these mixed results, than to find the defect confined to one form. In Case V we have idiocy, imbecility, deaf-dumbness, and lameness, combined with a large infant mortality. With regard to this last, there is a very general belief among the common people of Scotland, that the children of cousins are weakly, and of low viability, and my notes contain numerous cases which would support this. For instance, I have recorded of one cousin-union that there were ten children, of whom five died in early infancy. I saw all the survivors, and regarded them as sound and healthy; so that nothing but a tendency to defective viability appeared to manifest itself in the offspring in this case, though, of course, it is possible that among those who perished so early there may have been defects both of mind and body which were not recognised.

Cases in which two brothers have married two sisters, their cousins, are not uncommon; and, it has been said, that certain families appear to exhibit a tendency to cousin-marriages. From this it has been suspected that there may exist in such persons some exceptional character or condition which is passed on directly to their children, and that thus it may be a mistake to speak of defects among these latter as due to the *kinship* between their parents. In many cases, however, it would scarcely be a mistake so to speak of them; for, admitting the existence of some such family peculiarity as that spoken of, there could be no better way of securing its intensification than by effecting unions between cousins, *both of whom* would probably possess it, and who would thus run the risk of transmitting it to their children in a form so exaggerated as to be

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positive disease or defect there, though it might have been little other than a peculiarity, or, perhaps, an agreeable eccentricity, in themselves. If it be granted that such marriages tend thus to exaggerate such peculiarities, nothing more is asked, for nothing more is necessary to show that *they do harm*. The practical question is this,—should they or should they not be avoided? and the answer we are led to give is that they should, for the reason that they tend to injure the offspring. It matters not, practically, whether the injurious influence is the result of some mysterious effect, intrinsic in the *consanguinity* itself, or merely the result of this, that consanguinity increases the risks of finding undesirable or morbid peculiarities transmitted from parents to children in an intensified and dangerous form. If the results are disastrous, they will not be less so on one theory than on another, and the lesson will be the same. If relations by blood are liable to possess the same morbid tendencies, and if, by pairing among themselves for procreation, they are likely to transmit these tendencies in a dangerously increased form to their children, then it is surely their duty to avoid such unions, and to seek among strangers alliances with individuals *more likely* to possess qualities calculated to modify or counteract the morbid predispositions in question. It may be that there is absolutely nothing whatever in the bare fact of consanguinity, and that a marriage of kinship should be avoided on the same grounds as a marriage between any man and woman *both* predisposed say to insanity. In the case of cousins, though there may be nothing common to them of so marked a character as a declared tendency to insanity, still there may be common to them any one of a hundred transmissible peculiarities, which it would be very undesirable to send down to their children in an exaggerated form. Even a strong temperament common to both might thus be intensified into disease in their offspring. It follows, therefore,—as the chances of possessing similar peculiarities are great among relatives, and as intermarriage tends to give a dangerous strength to these in the offspring,—that to avoid such risks the prudent will avoid such unions as appear to increase them.

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Families and knots of the community among whom marriages of kinship prevail may be found to be so circumstanced otherwise as to favour the development of unhealthy peculiarities, but if blood-marriages are in practice found to strengthen these peculiarities in the generations which succeed each other, then they do harm and should be discouraged, whether the mere fact of consanguinity has anything to do with the result or not. This remains an open question, though, I think, many will be ready to go the length of admitting that—Given a man and woman not cousins both predisposed say to x, and a man and woman similarly predisposed who are cousins, the chances of transmitting x to the offspring will be greater in the last case than in the first; in other words, that the kinship will not be altogether silent.

If the general views just expressed be correct, it follows as possible that in a particular case the relationship of the parents may do no injury to the offspring. In other words, children of as great perfection may be born of parents who are cousins as of parents who are not. A man may nowhere find a better wife than in one related to him by blood—better I mean for his offspring. Facts, I think, bear this out, and the explanation lies in this, that there may be full cousinship of blood without much cousinship of quality. The two things do not *necessarily* go together; so that a man may possibly find in his own relative the very qualities best fitted to tone down or neutralise in his children those strong transmissible peculiarities in himself, which it would be undesirable to have exaggerated in them —exaggerated perhaps into acknowledged defect or disease.

But while all this is possible (and I believe it to be true of several cases well known to myself), it must be remembered that the chances are the other way; and for this reason unions of kinship should be avoided. When we deal with large numbers, I think it can be proved that this is the safer and more prudent course, and the best for society.

It by no means follows from what I have said that a man should desire in the mother of his children only qualities opposed to those which he himself manifests. There is a *beatissimum medium* in this matter as in all others. In point of fact

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it is often to a slight intensification in the offspring of certain qualities of body or mind, possessed equally by both parents, that we owe those salient physical or mental characteristics which impart a power of achieving great things. In a later part of my paper I shall have more to say on this point. In the meantime I shall proceed to detail and examine those facts on which I rest my conclusion, that consanguinity of parentage does tend to injure the offspring. The views I have briefly propounded as to the *modus operandi* may be sound or not, but the facts remain, and the inference I have drawn from them appears to be fair and well founded.

I have already stated that, in order to be able to determine the existence and measure of an evil resulting to children from consanguinity in their parents, it is necessary that we should have evidence of a more satisfactory character than any to which reference has yet been made. In the detail of startling cases, or in the grouping of cases furnished from the memory of the collector and from that of his friends, we do not obtain evidence which is likely to lead us to sound conclusions. We must, therefore, turn to some other mode of investigation for a supply of data from which we can draw inferences with greater security and confidence. It appears to me that the following line of inquiry is calculated to meet this demand.

1. Take a large number of instances of any defect which kinship in marriage is alleged to cause in the offspring, and ascertain how many are the issue of parents related to each other by blood, and how many of parents are not so related. Either the number must be so large as to preclude the possibility of selection in any form, or it must include as nearly as possible *all* instances of the defect which occur in the section of the community from which they are drawn; but in any case the number should not be small.

The results must then be compared with the proportion of cousin marriages to other marriages in the same community.

Unsoundness of mind is believed to be one of the defects in question, and I accordingly embraced the opportunities afforded by my position for ascertaining with accuracy and precision the history of the parentage of all insane, idiotic, or imbecile persons in a particular district of the country.

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Deaf-mutism is generally received as another of these defects, and I have endeavoured to find out what proportion of the deaf-and-dumb in this country are the children of blood-related parents.

After giving the results of these inquiries, I shall briefly state those of similar investigations in other countries.

2. The second mode of investigation consists in taking certain localities and collecting the family history of every marriage among the people there, and then comparing the results of those in which a kinship existed with the results of those in which it did not exist. The falsifying effects of unintentional selection are reduced to a minimum in this line of inquiry, which, if carried out on a large scale, would lead us more certainly to the truth in this matter than any other. But in that case, it would require to embrace a field so wide as to make it nearly impossible for any private individual to undertake the inquiry.*

I have succeeded in doing a little, and that little appears to me to have value, though not such a value as I hoped would be the case. I was prepared to encounter difficulties and disappointments, but I did not expect them to be quite so great as they turned out to be.

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* The question under discussion in this paper has been regarded as one of such interest and importance in France, that last year the following letter was addressed to the various Prefects by the Minister of Agriculture, Commerce, and Public Works:—"Sir,—The question so warmly debated in learned bodies as to the influence of marriages of consanguinity upon the physical aptitudes of the generations which are the result of these, gives quite a special importance to the table which the annual movement of the population should furnish me with respect to the number of marriages. Now, information derived from trustworthy sources authorises me to believe that these indications are remarkably incomplete as regards marriages between cousins-german. Omissions of this kind are very easily explained when we bear in mind that the marriages in question not being, as are those contracted between brothers-in-law and sisters-in-law, uncles and nieces, aunts and nephews, the object of legal prohibition, the local authorities have no regular means of recognising them. I beg of you, then, to issue special instructions inviting the mayors to make direct inquiries in the case of all future marriages, when the papers laid before them do not contain the necessary information whether the parties are related in the degree of cousins-german or even of cousins the issue of cousins-german." —*From the Medical Times and Gazette.*

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After personally visiting and examining the places chosen (when that was possible), I placed a schedule of queries in the hands of willing and competent persons. These queries were numerous and comprehensive, and I aimed at much more than in any case I have accomplished. In many instances the deficiency is such as to make the whole useless, and my labour is lost. Regarding other places, however, I have received much accurate, interesting, and valuable information.

On examining the results I find each place so isolated and separate from the others by individual characteristics as to make grouping or even close comparisons impossible. I shall, therefore, be obliged to state the results of each inquiry in detail, endeavouring to give only what appears to be relevant to my subject. In doing this it is possible that what I have regarded as relevant some may regard as irrelevant matter, but I think it fairer and safer to run the risk of this charge, rather than mislead by omission.

Having given this general description of the mode of investigation I have proposed to myself, I shall now proceed to state the results, and I have first to show what my inquiries have disclosed as to the connexion between unions of kinship and the actual idiocy and deaf-dumbness of our country.

The number of Idiots and Imbeciles in nine of the Counties of Scotland who are the Offspring of Unions of Consanguinity.

Ever since 1858, when visiting those lunatics in Scotland who live in private dwellings, the relationship of the parents has been a thing generally inquired into. It was not, however, invariably done, and when difficulties occurred, as frequently happened, about obtaining definite information, no serious effort was made to overcome these. In nine counties, however, visited during part of 1860 and 1861, I made careful inquiry *in every case*, exerting myself to the utmost to obtain the information desired. Notwithstanding this I often failed. Sometimes where the information was possessed, it was not given; but much more frequently it was not given, because not possessed. At times the great age of the patient explained this; at other times he had been born in a different part of

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the country, or even in England or Ireland, and both parents had long been dead; at times, again, neither of the idiot's parents was known to his guardians, or one might be well known, and nothing known of the other. It must be remembered that the idiot himself could in no case be my informant.

The counties to which I have referred were Aberdeen, Bute, Clackmannan, Fife, Kincardine, Kinross, Perth, Ross and Cromarty, and Wigtown. They represent a population of 716,210, and embrace 299 parishes, and form a considerable proportion of Scotland. The result of my investigation is as follows:—

The whole number of idiots examined was 711, including those in receipt as well as those not in receipt of parochial aid. Of these, 421 were ascertained to be the children of parents not related by blood, and 98 were the offspring of parents between whom there was a more or less close kinship. In 84 instances the relationship was not known, and 108 of the whole number were born out of wedlock. In a tabular form the results stand thus:—

(1.)	Whole number of idiots and imbeciles examined - -		711
(2.)	Of these—illegitimate - - - - - - -	108	
	... parentage not known - - - - -	84	
			192
(3.)	Total number whose parentage was known - - -		519
	Of these—parents not related - - - - -	421	
	... parents related - - - - -	98	
			519

Taking the whole number of idiots examined, including both the illegitimate and those of whose parentage I could learn nothing, we have 13·6 per cent. of the entire number born of parents between whom there was a blood-relationship. In order therefore to believe that such relationship does not influence the amount of idiocy, marriages of kinship would require in these counties to be to other marriages in the ratio of 1 to 7, which they notoriously are not, though unfortunately no facts exist to show precisely their relative frequency. I think, however, that it may be regarded as certain that such a ratio is about ten times higher than the reality.

But in order properly to test this influence of consanguinity,

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we must at least deduct the cases of whose parentage I could obtain no information. Those acquainted with the difficulties of such investigations will admit that the number of these is not great. This deduction then being made (711—84 = 627), the proportion rises at once to 15·6 per cent. This last may be regarded as referring to the whole community, since there is no reason for supposing that among the 84 of whose parentage nothing was ascertained a greatly different proportion would be found to be the offspring of blood alliances.

It may appear to some that a further deduction should be made. The paternity of the illegitimate is practically an unknown thing, and I have elsewhere shown that illegitimacy itself tends to produce defective children. The illegitimate idiots should, therefore, be deducted, *so that those idiots born in marriage of parents related by blood may be compared with those born in marriage of parents not so related.* If this be done it will be found that the former constitute 18·9 per cent. of the latter. Instead, therefore, of every seventh or eighth marriage in the community, we should require every fifth or sixth, to be between persons related by blood to each other, in order to show that consanguinity of parentage does not influence the amount of idiocy.

Of the 98 idiots whose parents were related, the degree of relationship was as follows:—

Cousins in - - - -	42 cases.
Second cousins in - - -	35 „
Third cousins in - - -	21 „
	98 cases.

It is probable that more second and third cousins intermarry than cousins, yet these last produce a larger number of idiots. The closer, in short, that the alliance is, the greater appears to be the danger. This, at least, is the teaching of the statement just made.

During the course of these investigations, 64 cases came to my knowledge in which more than one idiot existed in the family. In all of these but 5, I obtained the history of the parents. In the remaining 59, no less than 26 instances of blood-relationship occurred, or 44 per cent. This is an in-

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structive fact, showing that when we select cases in which the tendency to idiocy appears with force, then kinship of parentage also presents itself with a marked increase of frequency. Thus, while it appears that in nearly 1 out of every 2 cases in which more than one idiot occurs in a family, consanguinity of parentage is found; in those cases, on the other hand, where only one idiot occurs, such relationship only exists in 1 out of 5 or 6 cases. The exact results of this part of the inquiry I give below.

1st.—Of Parents Related.

Degree of Relationship.

12 Cases with 2 idiot children.	5 Cousins - - -	giving	24 idiot children.
	6 Second cousins - -		
	1 Third cousins - -		
10 Cases with 3	8 Cousins - - -	„	30 „
	1 Second cousins - -		
	1 Third cousins - -		
2 Cases with 4	0 Cousins - - -	„	8 „
	1 Second cousins - -		
	1 Third cousins - -		
1 Case with 5	1 Third cousins - - -	„	5 „
1 Case with 7	1 Third cousins - - -	„	7 „
26			74

2nd.—Of Parents not Related.

24 Cases with 2 idiot children, giving	- -	48 idiots.	
8 Cases with 3 „ „	- -	24 „	
1 Case with 4 „ „	- -	4 „	
33		76	

The whole 59 cases, therefore, give 150 idiotic children, but 26 of them give 74 of the whole, or within two of the number yielded by the 33 cases where no relationship existed, affording still another evidence that unions of kinship influence the amount of idiocy in our country.

The counties of Ross and Wigtown present peculiarities, an examination of which may throw some further light on the subject under discussion. I shall therefore detail more minutely the results of my investigation into these districts, of which a summary is exhibited in the following table*:—

* The under part of the table is a continuation of the upper.

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COUNTIES.	Total cases examined or reported on.	Number included in column A who were Idiots or Imbeciles.	Number included in column A who laboured under Acquired Insanity.	Number included in column A about whose parentage information could not be obtained.
	A	B	C	D
Ross and Cromarty.	189	146	43	68
Wigtown	71	60	11	15
Totals.....	260	206	54	83

No. of cases included in A, about whose parentage information was obtained.	No. included in E who were Idiots or Imbeciles.	No. included in E who laboured under Acquired Insanity.	No. of Idiots or Imbeciles (F) between whose parents there was a Blood-relationship.	No. of those labouring under Acquired Insanity(G) between whose parents there was a Blood-relationship.	Total No. between whose parents there was a Blood-relationship.
E	F	G	H	I	K
121	91	30	32	3	35
56	47	9	5	1	6
177	138	39	37	4	41

It appears, therefore, that of 177 insane persons, about whom reliable information was obtained, in 41 cases a blood-relationship within the degrees of first, second, or third cousins, was determined. This represents about 23 per cent.

Even if we take the whole number examined or reported on, and include the 83 about whom no information as to parentage is possessed, we shall have out of 260 cases 41 the offspring of relatives. This would represent about 16 per cent.

On either supposition, the influence of consanguine marriages in increasing the amount of unsoundness of mind is clear.

On referring to column H it will be seen that of the 41 cases who were the offspring of blood-related parents, 37 were idiots or imbeciles.

Of this class of the insane there is always a considerable proportion whose disease is not truly congenital, having its origin in the early period of extra-uterine life. Among those idiots or imbeciles, however, who are born of related parents, the proportion of this non-congenital idiocy I have found to be smaller than in the general class of idiots. In other words,

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given one hundred idiots the children of parents related, and another hundred the children of parents not related, it will be found I think that a larger proportion of the former are due to fœtal disturbances than of the latter.

Further, we find that proportionally a larger number of idiots and imbeciles are the children of related parents, than of maniacs, melancholics, etc., or of those labouring under that which, for convenience, I have called acquired insanity. If we take the whole number of idiots examined, 18 per cent. are children of related parents. If, again, we take the whole number of cases of acquired insanity the proportion falls to 7·4 per cent. But if we deal only with those of whose parentage we have information, then in the one case it is no less than 27 in the 100, and in the other 10 in the 100. From this it would appear that the amount of idiocy and imbecility is influenced by these unions to a greater extent than is the amount of the acquired forms of insanity.

It seems scarcely necessary to point out when such a statement is made as that 13 or 15 per cent. of all the idiots in the districts examined were the children of blood-related parents, that it by no means follows that the whole of that percentage is due to the consanguinity of parentage. Indeed, it is quite certain that it is greatly otherwise. All the other causes of idiocy will operate among the offspring of cousins as they do among the offspring of persons not so related; and it must always be remembered that these causes are very numerous and very varied. The idiocy of our country is not due to one but to a great many things, each of which contributes its share to make up the whole: one cause may be more powerful than another, but each influences the total amount. The facts which have been detailed render it very probable, if they do not *prove*, that a blood alliance between parents is one of these causes—influencing unfavourably the amount of idiocy in the land, but they do not exhibit definitely the measure of this influence, though they may and do aid us in estimating it.*

* There are many causes of idiocy which are undoubtedly of greater power than kinship of parentage. Hooping-cough, scarlatina, and measles, for instance, produce a large amount of the idiocy of Scotland, as they do

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The official reports to the governments of Massachusetts and Connecticut, on the amount and condition of idiocy in those states, exhibit a line of inquiry somewhat similar to that with which we are now dealing. The facts elicited by these investigations are briefly as follows:—

In 1846, commissioners were appointed under an act of the legislature of Massachusetts "to inquire into the condition of the idiots of the commonwealth, to ascertain their number, and whether anything can be done in their behalf." The report was prepared by the well-known Dr. Howe.

Of 574 idiots, with whom this report deals, the parentage was ascertained in 359 cases, and of these 17 were known to be the children of parents nearly related by blood. From collateral evidence it was concluded that at least 3 more cases should be added to the 17. This would show that more than one-twentieth (or about 5 per cent.) of the idiots examined were the offspring of the marriage of relations. Dr. Howe says:

"The statistics of the 17 families, the heads of which, being blood-relatives, intermarried, tell a fearful tale.

"Most of the parents were intemperate or scrofulous; some were both the one and the other; and, of course, there were other causes to increase the chances of infirm offspring, besides that of the intermarriage. There were born unto them 95 children, of whom 44 were idiotic, 12 others were scrofulous and puny, 1 was deaf, and 1 was a dwarf! In some cases all the children were either idiotic, or very scrofulous and puny. In one family of 8 children 5 were idiotic."

All the 17 cases referred to appear to have been cases of true congenital idiocy.

Again, in the report of the commissioners on idiocy to the General Assembly of Connecticut, in 1856, we find that 310 out of 531 cases reported an "adequate cause." Of these causes,

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probably of other countries. Hooping-cough, in particular, is often followed by imbecility or idiocy. We are too apt to think of idiocy as a congenital condition. In point of fact, however, a large proportion of the idiocy of the country has an extra-uterine origin, and, strictly speaking, is acquired and not congenital.

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consanguinity of parents was considered the probable one in 20 cases, or nearly 7 per cent.

On examining the results of the inquiry, however, we find that the question—"Were the parents of the idiot related by blood?" was only answered in 160 cases,—in 140 negatively, and in 20 affirmatively. Of these idiots, therefore, the relationship of whose parents was ascertained, 12½ per cent. were the offspring of consanguineous marriages.

Of the parents of the 20 the degree of relationship was as follows:—

Own cousins - - - -	12
Second cousins - - - -	3
Third cousins - - - -	1
Double cousins - - - -	3
Great-grandparents' own cousins - -	1
	20

Deaf-mutism in Connexion with Consanguineous Marriages.

Deaf-mutism is another of those defects which kinship of parentage is alleged to produce in the offspring; and we shall now endeavour to show how many of the deaf-mutes in this country are the issue of parents related to each other by blood, and how many of parents not so related.

The writer of an able article on the Vital Statistics of the Deaf and Dumb, in Knight's Cyclopædia, says, that, next to hereditary transmission, consanguine marriages are the most fertile source of deafness. "Every institution in the kingdom," he adds, "bears witness to this fact, in the numerous cases of pupils who are the offspring of first cousins."

Mr. Burton, of the Liverpool Institution for the Deaf and Dumb, in a paper published in the Medico-Chirurgical Journal of that city (Jan. 1859), says—"In an inquiry which I made some time ago, from a large number of persons, I found that about every tenth case of deafness resulted from the marriage of cousins."

Dr. Peet, the well-known Principal of the New York Institution, "gives it as his impression, that there is one such case, on an average, out of about every ten congenital cases, in which the inquiry has been made;" and he estimates that there is in

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that part of the United States hardly one family in fifty of which the parents were first or second cousins; so that, if, in the general population, there be 1 child congenitally deaf in 3600 born, there would be 1 in 700 of the children of cousins, or five times as many.

Regarding Ireland, we have some valuable facts, to which I shall presently allude, illustrating the extent of this cause of deaf-dumbness; but as regards America, much as it has added to the literature of deaf-mutism, and few countries have done more, on this point we have nothing but *impressions*, and I have searched in vain for *facts*. Not more successfully have I searched for such facts in the reports of our own institutions. Many of these are documents of the highest interest, and full of precise and well-arranged information; yet on this particular point we have little beyond the general expression of a strong opinion that such marriages are a fruitful cause of this calamity.

Under these circumstances, I resolved to write to the Superintendents of the sixteen institutions in Great Britain, requesting information as to the number of pupils under tuition who were the children of blood-related parents. I have to thank all of these gentlemen for a ready and courteous reply. In six of the sixteen cases, however, it was found impossible to give the information I desired. The state of matters, in the remaining ten is represented in the table below.

	1.	2.	3.	4.
	No. of Pupils in Institutions.	No. of Families represented.	No. of Pupils the offspring of consanguine marriages.	No. of Families represented.
I. *Scotch Institutions*:— Glasgow, Dundee, Aberdeen, Donaldson's Hospital	201	181	12	9
II. *English Institutions*:— Bath, Newcastle-on-Tyne, Swansea, Exeter, Doncaster, Brighton	343	323	16	15
Total.....	544	504	28	24

From the total number of pupils we must deduct 25 per cent.

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for acquired deaf-dumbness—a form over which consanguine marriages have but a small influence. This represents the average proportion of acquired deaf-mutism for Great Britain, and is far below that for the United States, which is 42 per cent., and that for Germany, which is 52 per cent.

This deduction being made both from columns 1 and 3, out of 408 deaf-mutes, we have 21 whose parents were blood-relations, or 1 in 20, which is considerably below the estimate arrived at by Mr. Burton and Dr. Peet.

If cousin-marriages, however, have no influence in the production of this result, then such unions, in the general community, ought to be to others in the proportion of 1 to 17. I have no figures to show that this is not the case, nor can I obtain them; but I believe all will at once agree with me in considering such a proportion as far too great. The average for Great Britain is probably not more than 1 to 60 or 70.

It will be observed that the 24 cousin-marriages yielded 28 deaf-mutes. Had the same proportion existed through the entire number of pupils, they ought to have been represented by 466 instead of 504 families. There is therefore a greater frequency of two defective members in one family when dealing with the offspring of blood-relations than when dealing with others. In the Irish returns (1851) this is still more evident. 154 cousin-marriages, in which deaf-mutism occurred, yielded no less than 235 mute members.

Dr. Peet, in his thirty-fifth annual report, in analysing Wilde's "Statics of Disease," says, that it appears that "of the Irish deaf and dumb, from birth, about 1 in 16 were the offspring of parents who were related within the degrees of first, second, or third cousins."* This does not differ greatly from the estimate which I have formed for Great Britain. Supposing cousin-marriages to be to others as 1 to 70, it will follow, Dr. Peet says, that congenital deafness appears at least four times, perhaps five times, as often from a marriage between cousins as from a marriage between persons not related.

* I have myself examined Wilde's report, and have some difficulty in seeing how Dr. Peet obtains these figures.

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Of the 235 deaf-mutes in Ireland who were the offspring of cousins, only 7 were cases of acquired deafness. This is greatly below the proportion in the deaf-mute population of all Ireland, which shows 11 per cent.* of acquired deafness and 7 per cent. uncertain. Instead of 7, therefore, there should have been 26 cases of acquired deafness. In other words, deaf-mutism, as it appears among the children of cousins, seems to be to a larger extent congenital than when it appears among the children of persons not related to each other by blood.

We now come to the second mode of investigating this question, which consists in taking certain localities, and collecting the family history of every marriage among the people there, and then comparing those in which a kinship existed with those in which it did not exist.

I have already pointed out the difficulties and disappointments which I encountered in conducting this line of inquiry, and I have also shown that it will be necessary to deal with each locality separately—groupings and comparisons being impossible. This mode of giving the information which I have obtained will, I think, best show the truth of the matter. I shall give it in full, even though some of the details may appear irrelevant or opposed to my conclusions, believing this to be the fairer and safer course.

St. Kilda.

Early in June 1860, I sent a list of queries relating to the people of this island to Mr. M'Raild, the factor, who makes a long annual visit to it. Having reason, however, to fear that he had left the mainland before the arrival of my letter, and understanding that Captain Otter, in the course of his survey of the Western Islands, would probably go to St. Kilda, I transmitted a similar set of queries to him, with the request that he would obtain answers through Mr. Kennedy the schoolmaster and catechist. From both sources I have fortunately

* This again is greatly below that for Scotland, England, America, or any of the countries on the continent of Europe.

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received replies to my communications, and these agree in all important respects. I am further indebted to Captain Thomas, who also visited the island in the summer of 1860, for much valuable information.

The population consists of 78 persons—33 males and 45 females. Of these only 4 are below the age of five, 6 between the ages of five and ten, 9 between ten and fifteen, 13 between fifteen and twenty, 12 between twenty and thirty, 9 between thirty and forty, 12 between forty and fifty, 11 between fifty and sixty, 1 between sixty and seventy, and 1 between seventy and eighty. At the census of 1851, the population consisted of 110 persons, with that great preponderance of females which still exists—a preponderance which, then as now, showed itself chiefly below the age of twenty. Above that age the difference is but slight. Forty years ago, Macculloch found exactly 103 individuals in 20 families; while Martin, 160 years ago, found 180 persons in 27 families. As regards my present inquiry it is of importance to find that the population is a diminishing, and not an increasing one.

There are 14 married couples on the island, being a fall from 19 at the census of 1851.

In not one of these couples is the relationship between husband and wife that of full cousins. Having in mind the small number of the people and their complete isolation, this fact surprised me, and differed much from what I expected.

Not less than 5, however, of the 14 are marriages between second cousins. Of these five couples 54 children have been born, of whom 37 died in early infancy, leaving 17 alive. Those who perished, passed away at an age to be reckoned only in days, and of them nothing can be told. But of the 17 survivors it is distinctly stated that *not one* is either insane, imbecile, idiotic, blind, deaf, cripple, deformed, or in any way defective in body or mind.

With regard to the rest of the population, only one insane person was found on the island, viz., C. M'L., who is described as upwards of fifty years of age, and of weak mind. As to her parentage, the schoolmaster was not able to give any information to Captain Otter, who kindly made inquiries at my request.

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At the date of his last visit she had left St. Kilda, and was residing in Harris.

In addition to this woman, I am informed that one or two others are "*slightly silly;*" but, on inquiry, it appears that these are cases rather of bodily than of mental weakness, the result, it is said, of accidents on the cliffs. They are young persons, however, and Mr. Kennedy states that, when under his care at school, he considered them "dull, but not silly or wrong in mind."

These particulars show the efforts which I made to arrive at a knowledge of the exact state of the case, and not to overlook those instances of slight defect which, in a backward community, are apt to pass unnoticed. "It is certainly strange," as Captain Otter remarks, "that though they marry so much amongst themselves, there is only one—a spinster—who is weak in intellect." Even this, of course, being 1 in 79, is far above the average for Scotland; but still it does not realise the disastrous results which one would expect to find in a community where more than one-third of all the married couples are related by blood,—even though this relationship is one removed a degree beyond that of full cousinship.

Among the queries which I transmitted, was one asking whether it was generally thought by the people of the island that a blood-relationship between the parents is injurious to the mental or bodily health of the offspring. The answer to this is, that no such opinion is commonly entertained. Martin, however, states that it was otherwise in his time, and that such unions were then condemned. From the fact that no marriage between full cousins exists among them, it is not improbable that the opinion may still operate, as far as is possible in a community so peculiarly placed.

Where the whole number of the people is so small, one or two strangers occasionally settling among them would, practically, be a large introduction of new blood. I, therefore, directed another query to this point, and I learn that of the 28 married persons in the island, who, with their offspring, represent within 4 or 5 of the entire population, there is "only one who does not belong to it, who has been imported,

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and who is not in the full sense a St. Kildian." This person is a woman from Lochinver, who married a native, and who had 14 children, of whom only two live—both unmarried. The common opinion that a stranger very rarely settles in the island appears, therefore, to be correct. At the census of 1851, every person found on the island was born there, except one woman who had come from Sutherland as the wife of a St. Kildian. This is the same woman who is still found to be the only stranger. None of her offspring are among the married couples. I am informed that the children of a father or mother, not native, are always the most ready to quit the island,—a natural result, but one by which the benefit of an introduction of new blood is lost to the general community.

The physical condition of the people appears to be good. Captain Otter says, "that when they pass the first fourteen days they grow up robust, healthy, and particularly clean in skin." Captain Thomas describes them as well-made, well-fleshed, good-looking, and smooth-skinned. He found many more fair than dark, the large majority presenting the Norse type. Macculloch says, "The men were well-looking, and appeared, as they indeed are, well fed; exceeding in this, as in their dress, their neighbours of the Long Island." All those who have had opportunities of comparing the condition of the St. Kildians with that of the Lewis people, those of Barvas and Shader in particular, seem willing to endorse Macculloch's opinion.*

Mentally, the St. Kildians are described as intelligent, sharp, cautious, sober, and moral.

In the course of these remarks I have made mention of persons having large families, of whom only two or three remain alive. This, unfortunately, is not the exception, but the rule;

* The backwardness in both islands, however, is excessive; and it has to be observed that it is a condition of backwardness even more than one of poverty. A gentleman, who had seen both places, writes of Lewis, that "it would be difficult to imagine anything more primitive, except nudity and raw food;" while in the "Census of Great Britain in 1851, published by authority of the Registrar-General," the dwellings of St. Kilda are spoken of as "dirtier than the dens of wild animals."

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and I have now to draw attention to a very dark spot in the vital statistics of St. Kilda. viz., the infant mortality, which is enormous. The cause of this is an affection now happily unknown, or all but unknown, to the rest of our country, viz., trismus nascentium.

Out of 125 children, the offspring of the 14 married couples residing presently on the island, no less than 84 died within the first fourteen days of life; or, in other words, 67·2 per cent. This exceeds the mortality from the same cause in the small island of Westmannó, near Iceland, where, on a calculation of twenty years, 64 per cent. of all children died of trismus, between the fifth and twelfth day of life. In Iceland itself, between 1827 and 1837, 4479 deaths are recorded under this heading, or 30 per cent. of the total mortality. In the Faroe Islands, also, this cause of death is very great. In the west parishes of the Lewis—Uig and Barvas—it is still known, but it is rare, and it is believed that it is becoming more and more so. St. Kilda and the west of Lewis are the only two spots in Scotland, if not the only two in Great Britain, where the disease still exists in an endemic form. The seizure usually occurs on the third day of life, and proves fatal within the week following. It is called in St. Kilda "*the seven days' sickness,*" and in the Lewis "*the five nights' sickness.*"

One curious effect of this great infant mortality is an increased fertility of the women. The average age of the 14 married women is 43½, and the average number of children to a marriage is 9; or 10, if we except the case of one couple without children. This fecundity appears to me to be explained by the infant's death doing away with the period of lactation, and so permitting impregnation again at an early period after parturition. On observing this, I turned with some interest to Schleisner's statistics of Iceland, and I find that exactly the same thing occurs there. He begins by observing that "almost all foreigners who have travelled in Iceland have mentioned the extraordinary fecundity of the nation as something remarkable." It is noticed that marriages with twenty children and upwards occur frequently. After a very careful analysis of the facts, he himself concludes that "the

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fertility of the Icelandic women is a great deal greater than that of the Danish." He offers, however, no explanation, but the way in which I account for it in St. Kilda appears sufficient for Iceland also.

One woman in St. Kilda, at the age of thirty, has given birth to 8 children, of whom 2 live, while two others have born 14 each, or 28 in all, of whom 24 are in their graves. The pestilential lanes of our great cities present no picture so dark as this. It is doubtful if it is anywhere surpassed, unless in some of the foundling hospitals of the Continent.

In writing of a visit to a people whose fecundity is so great, one would hardly expect to meet a remark like the following:—"The absence of children about the houses is most remarkable;" yet, such occurs in the letter of one of my correspondents.

What influence this great infant mortality may have on the surviving offspring, taken *as illustrative of the effects of consanguine marriages*, it is not easy to say. Had trismus been a disease which exercised a marked preferential claim on the feeble, or had it been one from which recoveries occurred, bequeathing cerebral and other nervous lesions to those whose lives it spared, the influence would have been more clear. It does not appear, however, to make any such selection. The most robust children as well as the weakest, those born of vigorous parents as well as those of feeble, those born of incomers as well as those born of full-blooded natives, all appear subject to it, and none recover. I think, however, that this large infant mortality renders the case of St. Kilda altogether so exceptional and so peculiar, that it must be used with caution in this inquiry.

The occurrence of trismus in St. Kilda appears to me to be connected with the character of the houses in which the people live. I have elsewhere* described the dwellings of some of the Lewis people, from which those of St. Kilda differ but slightly. I am assured, however, that this slight difference is to the advantage of the St. Kildians. Cap-

* Appendix to *Third Annual Report of the General Board of Lunacy, Scotland.*

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tain Thomas, who has had excellent opportunities of comparing the condition of both people, is of this opinion. He writes me that he regards them "as cleaner, better clothed, better fed, and better lodged." In this he is supported by Macculloch, Martin, and others, and much indirect evidence has been furnished to me leading to the same conclusion. From all I can learn, however, four important things are common to the houses of both places:—1st, There is no smoke hole. The thatch is put on nearly as much to be an accumulator of soot as a protector from rain, and it is removed every year for manure. 2d, The dung of the cattle, which are under the same roof, or rather in the same room, with the people, is allowed to accumulate below them from autumn to spring. 3d, There is a very scanty admission of daylight,—often none at all but that which enters by the door when open, or by chinks in the wall or roof. It is not a rare thing to find *no special provision* for the admission of light. 4th, As the thatch or roofing ends in the centre of the wall (which is 5 or 6 feet thick, and built of stone and turf), instead of overlapping it, and so throwing off the rain, the houses in such a climate are always, and of necessity, damp.

It is not a pleasant thing to see our fellow-countrymen inhabiting dwellings whose construction is so uncomplimentary to human intelligence. We say nothing of their internal economy.

It is a generally received opinion, that "nothing can be more satisfactorily proved than the tendency of a vitiated state of atmosphere to produce trismus."* Sixty years ago, in the Dublin Lying-in-Hospital, every sixth child born there died within a fortnight after birth, and nineteen-twentieths of these deaths were attributable to trismus. Dr. Clarke blamed the ventilation, improved it, and the mortality fell at once from 1 in 6, to 1 in 19·3; while under further changes, when Dr. Collins was master, the whole deaths fell to 1 in 58½, and of that diminished mortality only one-ninth resulted from trismus.

Schleisner attributed the disease in Iceland to the use of

* West on *Diseases of Children*, p. 143.

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birds' excrements as fuel, and birds' fat for lighting purposes, and in St. Kilda it certainly happens that the oil of the bird called the fulmar is burned in the lamps, but I cannot believe that this is the cause of the disease.

I made careful inquiry as to the mode of dressing the umbilical cord, but I did not find anything so exceptional in this matter as to lead me to suppose that it was in any way connected with the disease.

In short, I can discover nothing which appears to me to be so probably the cause of this disease in St. Kilda as the style of house in which the people live, and I am of opinion that if their dwellings are improved, as has been generously contemplated, one result will be the extirpation of trismus, and another, the seeming paradox, that the women will bear fewer children, and yet have more.

Had it been a question of lambs instead of children, the people would themselves, long ere this, have found the remedy for this vast preventable mortality. It may be, however, that, with Macculloch, they look on it as, "politically speaking, a piece of good fortune."

These details must not be regarded as wide of the question of consanguine marriages. In dealing with it, I felt that I had to consider everything bearing on it, directly or indirectly. One pathogenic feature of a locality or people can hardly be studied alone, if we are to avoid unsound conclusions. The proof of this I think we have before us, for the large infant mortality, in itself and in its consequences, obliges us to use the St. Kildian experiences with caution and hesitation in the elucidation of the influence of consanguine marriages upon offspring.

Scalpay.

It is generally supposed that in no part of Scotland are marriages of consanguinity so frequent as in the West Highlands and Islands. When I came, however, to make an effort to get the extent of this frequency definitely stated in figures the result often surprised me,—the popular impression sometimes appearing altogether groundless. The island of Scalpay presents a case in point. The schedule of queries was for-

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warded to the schoolmaster, who has long resided there, and knows every person on the island. The population he fixes at 341, and the number of married couples at 63, amongst whom it is said that there is not a single case of cousinship. Whether referable to this or not I cannot say, but it happens also, that there is not on the island either an idiot, an insane person, a cripple, or a deaf-mute. There is one case of blindness, but it was acquired in extreme old age.

In the marriage records of the Registrar-General, one of the headings, suggested I believe by Dr. Stark, is as follows:—"Relationship of parties, if any." In the large island of Lewis more than in any other place was I led to believe that these marriages abounded. The subject is much discussed there, and both the distinguished proprietor, and his chamberlain Mr. Munro, have directed their attention to it, as a source of evil to the people. I was, therefore, curious to learn the number of marriages registered there as between relations, and I embraced an opportunity of examining the registers of the parish of Uig, and with this result. Of 103 marriages registered during the five years from 1855 to 1859, a relationship between the parties is recorded only in two cases.

Again, through the kindness of Mr. Munro, I possess similar information for the parishes of Stornoway and Barvas. In the first, for the years 1858 and 1859 and for 1860 to October, 109 marriages were registered, and in none was any relationship recorded. In Barvas for the same period, 99 marriages were entered, with relationship given in two cases, and here it was not close, being in the one case that of "second," and in the other that of "third cousins." Out of a total, therefore, of 311 marriages, there were only 4 in which the union was between persons related by blood, or 1 in 78. And this, too, in a district where cousinship between man and wife is reputedly very common, and where the fixity of the population gives such a reputation an *à priori* probability.

My conviction, however, is that the public records do not exhibit the true state of the matter. I think the popular notion exaggerates the reality, while, on the other hand, the marriage registers understate it.

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Let me here detail some facts, which were the result of my own observation in the island of Lewis, and which bear immediately on the question we are discussing.

I reported on 35 cases of insanity, and of these 31 were idiots or imbeciles.

When analysed in their bearing on consanguine marriages it is found that there were born,—

1. Of parents known not to be related			16
2. Of parents known to be related,—			
Of cousins	2		
Of second cousins	3		
Of parents more distantly related	6		
Of parents who were the children of cousins	1		
		12	
3. Of parents of whom nothing could be determined. (This includes illegitimates),		7	
		35	

It thus appears that *at least* one-third of all the cases show a blood-relationship in their origin. On the supposition that this relationship has no influence on the production of idiocy, we should expect to find it in one-third of all unions in the island. This, however, would greatly exaggerate the frequency of such marriages. So that, after deducting freely for other causes of idiocy, many of which are unusually strong in this island, there still remains a large measure of this calamity, which with good reason we may regard as due to consanguineous marriages.

Bodily malformations are frequent in the Lewis. In the parish of Uig, hare-lip is very common. Nine cases were brought to my own knowledge. In the Lewis, and the parishes opposite to it on the mainland, I saw five cases in which there were supernumerary little fingers, one in which there were two thumbs, and one in which the fingers and toes were webbed. Curvature of the spine, deformity, and lameness were often seen in the island. Cases of congenital blindness and deaf-mutism are also numerous. I saw seven epileptics, several instances of chorea, and many of paralysis.

Berneray.—Lewis.

For information respecting this island I am indebted to Mr.

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John Macdonald, to whom I transmitted a series of questions, and who put himself to much trouble in order to give correct replies. He is the land-steward, an old residenter, and intimately acquainted with every family.

Berneray, which is in the parish of Uig, contains 427 people, and 74 married couples. Two of these are between full cousins, yielding 10 children, of whom 8 live. Not one of these is either insane, imbecile, idiotic, deaf, dumb, blind, lame, deformed, or in any other way defective in mind, morals, or body. Further, 6 marriages are between second cousins, yielding 20 children, of whom 18 are alive. Nine of the living children belong to one couple, the remaining 9 springing from 5 marriages. As in the offspring of those who were full cousins, so of these also is the report of both bodily and mental health without flaw.

We have thus a population where every ninth marriage is between blood-relatives; yet, instead of finding the island peopled with idiots, madmen, cripples and mutes, not one such person is said to exist in it.

Large as the number of such marriages is, it is below the expectations of my informant, who no doubt accepted the popular estimate of their frequency. My attention was directed to Berneray as a place where I should find them excessively numerous, considerably more so even than in the Lewis itself, and such appears to be the case. But had I taken the estimates which were given to me orally or by letter, without subjecting them to actual numeration, I should have been led to conclusions of great inaccuracy. This remark does not apply to Berneray alone, but to many other places to which my attention was drawn as likely to furnish information on this subject, and about which I took occasion to correspond. Of one such, for instance, on the N.E. coast of Scotland, I was told that "about 50 per cent." of all the marriages were between persons related by blood. I visited this village, and satisfied myself that the estimate was enormously above the fact, and that without actual numeration I could not safely use any such general and indefinite information.

Mr. Macdonald expresses his astonishment thus:—"I was

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much surprised to see so few first and second cousins married in Berneray island, and were I not certain of it, as I am now, by a minute search, I would doubt the fact, from the island being inhabited by the present race from time immemorial."

He tells me that the island is remarkably healthy, and that cases of longevity are common. He cites the instance of a man who died in 1859 in his 99th year, having 2 sons, 5 daughters, and 132 grand and great grand-children.

One of my queries ran thus :—"In general terms, have you observed in the island of Berneray that the intermarriage of blood-relations affects the offspring injuriously in their bodily, mental, or moral health?" To which he replies,—"I have observed no such injurious tendency in this island." Had he answered this question before collecting the foregoing facts, I feel satisfied he would have done it differently, for immediately after the answer he appends this note :—"In Valtos, a township in this parish, a couple, full cousins, natives of Berneray, have two or three children both deformed and imbecile." The great affliction in this case, associated with a cousinship of the parents, would almost certainly have presented itself to his mind when called on to give the opinion asked, and would probably have coloured his reply had he not had the facts regarding Berneray in figures before him.

Phthisis in the Hebrides.

I have here to direct attention to a singular pathogenic feature of the Western Islands, to four of which special reference has been made. I first heard of it from M. Boudin, whom nothing relating to the geographical distribution of disease seems to escape. Several years ago, when writing to me about the absence of phthisis in Iceland and the Faroes, he pointed out that in Great Britain also it seemed to diminish in frequency as we went North, and that in Lewis especially its rarity was very observable. Now, consumption and strumous diseases generally are believed to be among the most certain results of consanguine marriages; and it appeared to me strange that in that part of Scotland where such marriages most prevail, these forms of disease should be reputedly rare. Accord-

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ingly, while in these islands, I made careful inquiries on the subject. Immediately after my return, a very able paper on "Phthisis in the Hebrides," written by Mr. Morgan, appeared in the *Medico-Chirurgical Review*.* He founds his conclusions on his own observation in Raasay, and on the testimony of a large number of medical men practising in the North-West Highlands and Islands of Scotland, who communicated to him their experience on the subject. The impression which a perusal of this evidence leaves on the mind is, that the disease is not simply comparatively rare, but that it is almost absent. The predecessor of Dr. Millar (in Stornoway), when filling up schedules of life insurance, to the question relating to the death of the proposer's relatives by phthisis, is said to have invariably answered,—"No such disease is known in the island." Both Dr. Millar and his colleague Dr. Macrae, the only two medical men in the island, I understood to say, that though the disease appeared to them rare, it was by no means absent. Had I been left to form a conclusion from what I myself had an opportunity of seeing and learning while on the spot, it would have been to the same effect. The *impression* of its rarity was irresistible, while at the same time I was assured of its presence by actually seeing several cases. I am inclined, however, to think that it is not so rare as Mr. Morgan appears to regard it; but the difference of opinion hinges only on the degree.

In July 1860, when in the parish of Uig, on the west coast of Lewis, where I was led to understand the minimum of frequency was attained, I examined the registers for the two years 1858 and 1859. During that period 75 deaths are recorded, and of that number 8, or 1 in 9 are entered as resulting from consumption. Yet in the parish of Harris, immediately to the south of that, Dr. Clark, during 32 years, could not remember more than half-a-dozen deaths from phthisis.†

It is possible, however, that these 8 people did not really die of phthisis, as I found that, of the 75 deaths, in 2 cases only was the cause of death entered under the certificate of a medical man. From 1855 to 1859 inclusive, only four deaths were so certified. Those who have visited this part of Lewis,

* *Med.-Chir. Rev.*, No. 53. † *Med.-Chir. Rev.*, No. 53, p. 484.

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and know its extreme inaccessibility, will not wonder at this. From such data, therefore, conclusions must be drawn with caution.

It may serve further to strengthen this view, if I give all the causes of the 75 deaths, when it will be observed, that it is not merely in the absence of phthisis that the pathogeny of this district differs from the rest of Scotland :—

1859.	1858.
3 Consumption.	5 Consumption.
1 Croup.	2 Croup.
1 Asthma.	1 Influenza.
14 Influenza.	11 Old age.
3 Inflammation.	8 Not known.
1 Old age.	4 Inflammation.
7 Not known.	2 Dropsy.
2 ?	1 Exposure to cold.
—	1 Rheumatism.
32	1 Epilepsy.
	3 Drowned.
	1 Palsy.
	1 Fever.
	1 Smallpox.
	1 Lockjaw.
	—
	43

The north-west parishes of Scotland as well as the Hebrides reputedly enjoy a comparative immunity from consumption.

In Ardnamurchan, with a population of 5000, a medical man assured Dr. Browne that, during sixteen years, he had seen only two cases of phthisis. In the neighbouring parish of Kilmallie, however, 306 persons died during the five years from 1855 to 1859, and of these 33 died of phthisis, or about 1 in 9, while pneumonia, asthma, and bronchitis together, killed other 22. In all, 55 appear to have died of thoracic disease, or 1 in 5½.

Struma in its other forms is also said to be rare in these districts, and my own observation, which would have been of little value, from the shortness of my stay, had my attention not been directed to the subject, supports this.

I have introduced these remarks on phthisis in the Hebrides because I felt that, in considering the effects of consanguine marriages on the production of idiocy in this district, the

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marked rarity of one of the most generally admitted effects of those marriages demanded allusion and comment.*

Burnmouth and Ross—fishing village on the south-east of Scotland.

My attention was drawn to this place as being one in which consanguine marriages were very frequent, yet where the alleged evil results were not found.

I have had three opportunities of visiting this village, and on each occasion I made minute inquiries regarding the frequency and effects of such marriages, and I collected at the same time as many facts as possible bearing on the question.

The village is situated at the foot of the cliffs and close by the sea-shore. Its position has originally depended on its suitability for smuggling operations, and not on its salubrity, since the houses are necessarily rendered damp and unhealthy by the proximity of the rocks. The colony is not more than 120 years old, and the first settlers are believed to have been of a good stock,—bold and enterprising men. Some of them, in the navy and merchant service, distinguished themselves during the war, and rose to good positions, not through courage alone, but also through a superior intelligence.

The fisherman of Burnmouth at present are tall, strong, active men; swarthy, high-featured, and strongly whiskered.† They were long regarded as a saving, provident, and sober people. They are remarkably well and warmly clothed, every man having a good and complete waterproof suit for use at sea. In this respect the contrast between them and the fishermen of the Ross-shire and Morayshire coasts is striking. They are good boatmen, and have large decked boats, with which they go to Yarmouth, the Isle of Man, and the Lewis. Some-

* Since writing the foregoing (in January 1861), I have had an opportunity of perusing Dr. Stark's observations on the same subject in the First Detailed Annual Report of the Registrar-General. He seems to regard it as proved that the Western Islands exhibit a marked freedom from consumption, but does not think the registers afford materials for giving the precise measure of the exemption.

† They are believed to be of Anglo-Norman origin.

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thing of the character and spirit of the men is learned from the very names of their boats—"The Dexterous," "The Flying Cloud," "The Speedy," and such like,—contrasting curiously with such names as "The Isaac Main," "The Martha Paterson," etc., so general in the north-east. The two fish-dealers or curers of the village are of their own stock, and not of a different and imported class, as happens so generally in the north. They nearly all read and write, and at present very few children at a school-going age are not regularly there.

The women are also tall, stout, and high-featured, have no peculiarity of dress, and do not carry the fish to market. Each family keeps a servant—often the daughter of a hind.

The houses, in spite of their dampness, are clean, orderly, and well furnished, and equal in all appliances for comfort to the houses of the labourers or tradesmen of the district. My description is that of an average house, to which of course there are exceptions. There is, in short, a general evidence of well-being in the whole surroundings of the people.

The population of the two connected villages of Burnmouth and Ross is generally estimated at 420.

Careful inquiry only brought to light seven marriages between full cousins, and I could not hear of a single case where man and wife were in the relation of second-cousins. There are, however, many marriages between persons where a blood-relationship is recognised, but which is so distant and undefined as to be without a name.

Of these 7 cousin-marriages the result is seen in the following table:—

	No. of Children born.	No. Dead.	No. Living.	Remarks regarding the Children.
I.	6	3	3	Those living, big, strong, sound, & healthy. Those dead, said to have been sound.
II.	6	...	6	"Never had a headache."
III.	9	1	8	All sound and sane.
IV.	1	...	1	Sound. Newly married.
V.	3	2	1	The living one not robust.
VI.	5	1	4	All sound.
VII.	5	...	5	All alive and sound.
Totals.	35	7	28	

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This certainly does not appear to speak strongly against a blood-relationship of parents. Thinking that I might find the evil manifesting itself in the next generation, I made inquiries as to the families of those of the 28 living children who are married. Of these, there were only three, and each of these had married a person distantly related by blood. The result is shown below.

	No. of Children born.	No. Dead.	No. Living.	Remarks regarding the Children.
I.	7	1	6	All healthy.
II.	6	2	4	All the living sound. The two deaths were in infancy.
III.	...	...	...	Barren.
Totals.	13	3	10	

Here again, however, I did not find what might have been expected, and I then made inquiry as to the number of persons defective in mind or body in the whole community, and with the following results. There were found,—

a. Two imbeciles, whose weakness of mind was not great, and who were both self-supporting. Neither was the child of parents related by blood.

b. Two cases of acquired insanity, both women. The disease in both cases resulted from grief and fright on suddenly hearing of the death of their husbands by drowning. The parents of one were distantly related.

c. One case of epilepsy in a child, whose parents were not related. The fits are not frequent, and the mind not much impaired.

No lame, deformed, blind, dumb, or paralytic person was heard of; and in the school, which was twice visited, and where nearly all the children of the village were seen, strumous sores were not found, nor were the children puny, pale, or languid. They were, on the contrary, merry, active, well clothed, and with a look of substantial feeding. Their teacher, however, considers them to be slower and duller than the other children under his care.

None of the children of cousins were here found defective

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in mind or body. There was found, however, in the whole community a considerable number of unsound persons—a proportion to the whole population above that for Scotland generally.

On making inquiries as to the number of paupers in the village, I found that there were six—all widows. Of four, the husbands were drowned, and two are aged women (86 and 93), who have outlived their husbands, children, and all natural supports. On the whole, this also indicates a favourable state of the community.

It then occurred to me that there might possibly be a larger infusion of fresh blood than was generally thought, and I am inclined to believe that this is the case,—more particularly of late. It is a saying of the district, that "a Burnmouth man never goes to the bankhead for a wife"; and in smuggling times, when secrecy was needed and when it was desirable to keep a knowledge of their doings and connexions among themselves, it is possible that this was nearly true. It is not so, however, now, for five of the married women are known to me to be imported, and there are probably more. All of these were the daughters of hinds, who entered the place as servants. In addition to these there are also many married women who are the children of imported mothers. There is thus a considerable infusion of fresh blood into this small community.

With regard to the rate of infant mortality, the tables which I have given show that this is not small, but it is by no means remarkably large. It further appears, from the parish registers which I searched, that during the three years, 1857 to 1859, 21 persons died, of whom 7 were drowned, and 4 died under the age of six months, and 1 more under ten years. During the same period 33 children were born, of whom 3 were illegitimate.

During the five years preceding my visits only one marriage has been recorded in the registers as between cousins.

The general feeling of the people, as communicated to me, is distinctly against such marriages, which they regard as "bad for the offspring". One shrewd old woman, however, added this important remark,—"But I'll tell ye what, Doctor, bairns that's hungert i' their youth aye gang wrang. That's far waur nor sib marriages."

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The Fishing Population of a small Town on the North-East Coast of Scotland.

For information regarding this place I am indebted to an educated fisher-lad who resided there, and who collected the facts under the superintendence of a person intimately acquainted with the whole fishing population. I have myself had several opportunities of testing the substantial accuracy of the statements.

The fishing population is estimated at 779, and contains 119 married couples, and about 60 widows and widowers with or without families.

Of the 119 married couples, in 11 cases the union is between full cousins, and in 16 between second cousins; or, in other words, in 27 instances there is a blood-relationship. This is in the proportion of 1 to 4·4 of all marriages. Of these 27 marriages, including 3 which are barren, 105 children have been born. Of these children, 38 are dead (35 having died in childhood), 4 are deaf-mute, 4 are imbecile, 4 are slightly silly ("want a cast"), 1 is paralytic, and 11 are scrofulous and weakly. In other words, 24 out of the 67 living children labour under defects of body or mind, while 1 in 17 is an avowed imbecile, and 1 in 8·4 is weak in mind. These facts are of such a character as to lead us to suspect that more than one of the causes of idiocy must be strong in this community.

The children of those who are full cousins* are described as being "*all* of them neither strong in mind nor in body", and the fishers of this place, as a class, are said to be "below par in intellect". In this last opinion I am inclined to concur. It is true, I believe, not of this locality alone, but of nearly all the fishing villages which fringe the north-east coast of Scotland. There is a general lowering of the physical and mental strength in these communities, which is popularly attributed to this system of in-and-in breeding. When compared with the agricultural population, or with the tradespeople of the small towns in the neighbourhood, they are, as a race, inferior both in bodily vigour and intellectual capacity, while their thriftless-

* There is *said to be* an aversion to cousin-marriages, but, it is added, "cousins' bairns go together readily."

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ness, facility, and want of foresight are notorious. This opinion is founded on personal observation, as well as on the testimony of others. It is popularly thought that, in this respect more than in any other, the evils of consanguine marriages, continued from generation to generation, are evidenced,—the defect at length appearing to become *racical*. I must here state, however, that so far as my own observation goes, and so far as I have learned from others, there seems to be in such communities no exceptional liability to acquired insanity. Indeed, it is believed by many rather to be otherwise.

It has often struck me that the men of these villages had small heads, and so strong has this impression become of late, that I resolved, if possible, to test its accuracy by measurement. I have been fortunate in securing the assistance of a gentleman, who has obtained much curious information for me from the large hat manufacturers of Scotland. I shall not at present communicate this in detail, but shall content myself with stating such facts as may possibly bear on my inquiry.

All unite in saying that the average hat for Scotland is "$7\frac{1}{8}$ small",—representing a head $22\frac{1}{4}$ inches in circumference, or rather more. The average, however, for the east-coast fishing villages, from Fife to Caithness, is $6\frac{7}{8}$ and 7, representing circumferences of $21\frac{5}{8}$ and 22 inches,—the extreme north having slightly the advantage. The difference is better seen thus:—A merchant whose trade lay in any small town in the agricultural districts, say of Perthshire, and whose stock was exhausted, wishing to renew it by a purchase of two dozen hats, would select sizes as given below; while a merchant whose stock was in the same position, and who supplied a fishing village on the north-east coast, would make a different selection, as is also shown below:—

Small Town in Agricultural District of Perthshire.				Fishing Village on North-East Coast of Scotland.			
1	of	$6\frac{3}{8}$	size.	3	of	$6\frac{3}{8}$	size.
2	...	$6\frac{7}{8}$	...	6	...	$6\frac{5}{8}$	...
5	...	7	...	8	...	$6\frac{7}{8}$	...
8	...	$7\frac{1}{8}$	...	4	...	7	...
5	...	$7\frac{3}{8}$	...	2	...	$7\frac{1}{8}$	...
2	...	$7\frac{5}{8}$	...	1	...	$7\frac{3}{8}$	...
1	...	$7\frac{7}{8}$	...				
24; mean, $7\frac{1}{8}$				24; mean, 7			...

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The small towns in the agricultural districts of Aberdeenshire exhibit a still larger mean size, and the upper central district of the Stewarty of Kirkcudbright perhaps the largest in Scotland.

It appears probable from these figures that in the district referred to the fisherman's head is really a small one, but if any one desires easily to convince himself that it is so, he has only to try to fit a $7\frac{1}{8}$ head with a "sou-wester" in the shop of a fishing village on the north-east coast. I have myself repeatedly seen this trial made.

Fishing Villages of Portmaholmack and Balnabruiach, in Easter Ross.

For the information which this locality supplies, I am indebted chiefly to Mr. John Ross, inspector of poor of the parish of Tarbat.

The population of the two villages, which adjoin each other, is estimated at 1548, and the number of married couples at 355. Of the marriages there are 62 between full cousins, and 20 between second cousins or between persons more distantly related. There is a blood-relationship, therefore, in 82 cases, or, in other words, in nearly one-fourth of the whole number of marriages.

The number of children born of these 82 couples was 340, of whom 250 are alive.* Most of those who are dead, were cut off in infancy, and nearly all of them below the age of 10.

Of the whole number of the offspring of these consanguine marriages there are, or were, 2 imbeciles, 1 idiot, and 2 cripples.

The number of children born of the other marriages, where the parents were not related by blood, was not ascertained, but at the same birth-rate, it should amount to 1160, and, the mortality in childhood being the same, there should be 852 now alive. Although the whole number of the offspring was

* These numbers are not given as *absolutely accurate*. Except by an official inquiry such accuracy could not be attained. The facts, however, were collected with care, and, I am assured, may be regarded as "*very correct*."

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not determined, it was found, however, that it included 4 imbeciles, 2 idiots, 2 insane, and 2 cripples.

This result shows that such calamities fall on the offspring of blood-related parents with greater frequency than on the offspring of parents not related; in the proportion of 2 to 1·2. But this by no means comes up to common expectation. When I began this inquiry my reading on the subject had prepared me to expect worse results, and conversation with Mr. Ross led me to suppose that I should find such anticipations realised in the statistics of these villages. In transmitting them, however, he observes: "It is my opinion still, notwithstanding the above figures which apparently speak favourably, that such intermarriages tend to lower the physical and intellectual powers of the offspring. Yet in a locality such as Portmaholmack, where out-door exercise and ablutions in salt water are a part of the everyday business of life, I am fully convinced that the evil effects are in a great measure counteracted by these healthy occupations." He makes this remark in reply to a query asking his own opinion on the subject, "as founded on observation in these villages."

General Remarks.

This concludes the evidence which I have collected under the second mode of inquiry recommended.

With reference to none of the localities have I been able to obtain the full information I aimed at. Indeed, I am very conscious that I am far from having succeeded in doing what I proposed to myself. I regret this all the more that I think no method of investigation would so satisfactorily settle this vexed question as that now referred to. The result of my efforts, however, convinces me that it could not be carried out in a thoroughly satisfactory manner by any private individual. If, for several districts of the country not too limited in size, and differing from each other *quoad* the social condition of the people, we could obtain full and accurate information as to the family history of *every* marriage in which a blood-relationship existed between man and wife, and also of *every* marriage in which no such relationship existed, we should assuredly have

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before us a mass of facts from which we could draw conclusions of a definite character and worthy of trust; but to obtain possession of such data will never prove an easy task.

It appears to me, however, that my research, though it has fallen short of what was intended, has nevertheless resulted in the collection of some useful and interesting matter, through which a certain amount of light is thrown on the influence of consanguinity in parentage upon children. The facts which I have detailed appear to show a great unsteadiness in the character of this influence. Sometimes we seem to find little or no proof that it is an evil influence. At other times this bloodship in the parentage appears to be the origin of much injury to the offspring. More frequently still the facts admit of various interpretations, and are not very clear or satisfactory in their teaching. It is of importance, however, to know that these differences or seeming differences may occur, and to learn that it is necessary to widen the field of observation, and carefully to inquire into all those circumstances by which it is quite clear the results may be and often are exaggerated, modified, or concealed. It is evident that these results will not be the same under all circumstances,—nay, more, it becomes probable that, to some small extent at least, we have the power of controlling them.

In detailing the facts with reference to each locality, I have done my best to secure accuracy, and to be as full as was consistent with relevancy. As regards the last point I had often the difficulty of doubt, but I have omitted nothing which in my opinion could in any way bear on the question. As regards the first point it must be remembered that a great part of the information was collected for me by others, whom I regarded as competent and trustworthy. I had myself opportunities of visiting many of the localities, when I made such inquiries as I thought would test the value of the statements communicated to me; and where I had not such opportunities, by frequent writing I did what I could to ensure a substantial accuracy, which was all I could reasonably expect.

I have made no effort to arrange or group the facts so as to

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support one theory or the other, but have given them disjointedly, with such occasional remarks or reflections as they suggested. Each reader can thus form his own opinion as to what they teach.

If taken *as a whole* and fairly interpreted, it appears to me that they lead to the same conclusion as that drawn from the first line of inquiry, viz., that consanguinity in parentage tends to injure the offspring.

They appear however, to point to more than this general conclusion;—as, for instance, that in all classes and conditions of society and under all circumstances, the manifestations of this injury are not alike either in character or degree. It would seem that when these unions of kinship are continued through many generations (in certain classes of the community at least), the evil may show itself rather in a general deterioration of the race than in striking abnormalities and defects. Again,—the results appear to be least grave, when the parents are living in tolerable comfort, without ambitions, anxieties, or much thought of the morrow; when they follow healthful open-air occupations, living by their muscles but not overworked, and easily earning enough to procure good food and clothing; when they lead routine but not indolent lives, working but not struggling for existence; when they have a fair education, but are without pretence of refinement; when they steadily adhere to sobriety; when, in short, they have good constitutions and are able to manage these wisely after marriage. On the other hand, when the parents are poor, pinched for food, scrimp of clothing, badly housed, and exposed to misery; when they have to toil and struggle for the bare necessaries of life—never having enough for to-day and being always fearful of to-morrow; and especially when, in addition to all this, they are intemperate in their habits, then we find serious evidences of injury, the congenital forms preponderating and bodily malformations being frequent.

It will at once be perceived that, even if consanguinity in parentage had no tendency to injure the offspring, the results I have just described might be expected to follow the con-

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ditions I have described. Where the whole surroundings and mode of life of a community are such as keep the health-point high, it is clear that *all* sources of disturbance, whatever be their nature, will be controlled in their operation; and where the reverse holds, these sources of disturbance will be favoured in their work, and intensified. Even diseases which are purely hereditary will be transmitted to the offspring with a force and frequency which will vary according to circumstances,—according to the circumstances, indeed, of which we are now speaking. But it must be borne in mind that the injuries which result from consanguinity in parentage are very closely akin to injuries from hereditary transmission. It is believed that they are so at least in the great majority of cases,—since they generally result from this that, where there is a blood-relationship between parents, both of them are more likely to have the same disease to transmit to their children than they would be if there was no such relationship; which disease, going down from *both* father and mother, will probably present itself among the children frequently and in a severe form.

It occurs to me here to state that in forming some of the opinions expressed in this paper, I have been insensibly influenced by a host of little things which have come under observation during the inquiry, and which I could not here detail. Such an influence, I think, is legitimate, and can scarcely be resisted. It would be more correct, perhaps, to speak of it as having given strength or weakness to conclusions drawn from stateable evidence, than as having itself led to separate and independent opinions.

Before proceeding to give the general conclusions which I have drawn from the whole research, I shall briefly examine the argument from the practice of in-and-in breeding in the lower animals.

Argument from in-and-in Breeding in the Lower Animals.

One would expect to find this field of inquiry peculiarly rich in experiences tending to clear away doubts as to the effect of unions of consanguinity. In the breeding of his stock, the farmer exercises a complete control over all arrangements, and

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knows definitely the character of the issue. From such opportunities and advantages we might reasonably look for precise information. This will not, however, be found either in the literature of farming, or from personal inquiry of those who might be presumed to possess it. All farmers, however, are united in expressing the general opinion, that *in-and-in breeding* tends in the long run to the deterioration of the stock. But this statement receives one qualification from one, and another from a second, and so on, according to individual experiences and with special bearings.

The system of in-and-in breeding appears to have been most practised in Short-horn cattle and Leicester sheep. With regard to the latter, it is notorious that Bakewell bred only from his own stock, and, as Professor Low says, "did not "scruple to connect together animals the nearest allied in blood to one another."* Colling, too, in perfecting his Short-horns, did the same, "disregarding affinities of blood."† Mason of Chilton is also said to have pursued the same course. And Mr. Stephens says, that "there are breeders in England at the present time who maintain that it is the best system, and will follow no other."‡ In rearing game-fowls, Mr. Blaine tells us, that the intercourse of a third remove is sought and considered best;§ and one of my correspondents, the possessor of a flock of fine old Scotch sheep, numbering about seventy, informs me that they are all related by blood, and have been so for eighty years. I am assured that some winners on the racecourse have had the same sire and grandsire, being also nephews of their own sires. The same thing I believe to be true of many of the prize-taking Short-horn bulls and Leicester tups.

One is startled by such facts and statements, which are not easily reconciled to common notions, nor to the disapproval of in-and-in breeding which is generally and distinctly expressed. Youatt gives his opinion thus,—"Though some may deny it, it is the fact that strict confinement to one breed, however

* Professor Low, *Domestic Animals*, 191.
† Low, *op. cit.*, 382.
‡ *Book of the Farm*, Stephens, 6273.
§ *Outlines of Veterinary Art*, 3rd edition, 325.

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valuable or perfect, produces gradual deterioration;" and Sir J. Sebright, a great authority, says,—"I have no doubt by this practice being long continued, that animals would in course of time degenerate to such a degree as to become incapable of breeding at all." Professor Low tells us, that even Colling latterly "began to experience that impairment of constitution in his animals which never fails to accompany a continued intermixture of blood in a limited number of animals." In short, nearly all give a general disapproval and condemnation of the system. The precise character of the evil Mr. Stephens states more definitely than other writers,—indeed, no one discusses the whole subject more fully. In his work on the Farm, he tells us,* that the bones become small and condensed in texture, the skin thin and open, the hair or wool short and thin set, the head and hoofs small, the ears thin and broad, the carcass reduced in size, and the eyes often affected with wateriness; that lameness is frequent; that a liability to catarrhal affections and consumption is established; that disposition to fatten appears; and, generally, that the whole constitution is much weakened. Professor Low,† in speaking of sheep, says, that the system acted on for many generations tends "to render the animals more the creatures of an artificial condition, more delicate in temperament as well as form, less prolific of lambs, and less capable of supplying milk to their offspring.

I have also seen it remarked that the offspring of such unions are placid and not easily disturbed when feeding, exhibiting a sort of imbecile indifference to what goes on around them,—a quality of great value for quick fattening on little food.

The more, however, that the history of Short-horn cattle and Leicester sheep is studied, the stronger does the impression become that these breeds are but the perfection of desirable imperfections—desirable, too, not to the animal itself, but to its owner.

Everything is "secondary to the property of producing in the shortest time the largest quantity of fat with the least consumption of food." The great desideratum is an early arrival

* Stephens, *op cit.*, 6274.

† Low, *op. cit.*, 192.

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at maturity, or at premature age,—an early maturity, too, of particular parts,—of muscle and fat especially.*

After all, then, in these cases where in-and-in breeding has been practised with so-called good results, the issue is nothing but the development of a saleable defect, which, from the animal's point of view, must be regarded as wholly unnatural and artificial, and not calculated to promote its wellbeing, enjoyment, or natural usefulness; and in this view all difficulties disappear. By in-and-in breeding we can certainly establish an artificial type, and fix a peculiarity which is unnatural, and whose only value is its profitable convertibility into gold; but no evidence whatever exists that by such a system of breeding we can improve the natural animal.

Strictly viewed, Colling's "Comet" was neither more nor less than a perfect abnormality—a deviation from a natural animal, perfect in a desired direction. Just as this sort of perfection increases, however, the less useful does the animal become to himself, *if left to himself*, and if deprived of that artificial keeping and management which his artificial constitution demands. If it should become desirable to perpetuate any *peculiarity* in man, then in-and-in breeding may have *good* results,—the results being estimated as good or bad according as they realise, or do not realise, the end in view. I know the case of a man who has supernumerary little fingers, and whose two children and seven grandchildren have the same. Were additional little fingers of great value, the surest way to obtain a race having this peculiarity would certainly be to establish blood-alliances in this family; and when we obtained the desired excess of fingers in the offspring, we should then have the same sort of reason for saying that kinship of parentage had done good, as the farmer has for saying that it has done good when he looks on his Leicester sheep, with little heads and small bones,—ripe, fat, and ready for sale in their very lambhood.

Till the excellencies of man are estimated in pounds or inches; till the aim be a perfect artificial and not a perfect

* Low, *op. cit.*, 192 and 388.

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natural man; till we want legs at the expense of arms, or arms at the expense of legs, or brain at the expense of muscle, or muscle at the expense of brain; till we want maturity in babyhood, and premature age; till the perfect man be something else than a well-balanced development of all his components, bodily and mental,—we can scarcely apply the experience of breeders of stock in human physiology.

Conclusions.

The general conclusions to which I have been led by this investigation are briefly as follows:—

I. That consanguinity in parentage tends to injure the offspring. That this injury assumes various forms. That it may show itself in diminished viability at birth; in feeble constitutions increasing the risk of danger from the invasion of strumous disease in after-life; in bodily defects and malformations; in deprivation or impairment of the senses, especially those of hearing and sight; and, more frequently than in any other way, in errors and disturbances of the nervous system, as in epilepsy, chorea, paralysis, imbecility, idiocy, and moral and intellectual insanity. That sterility or impaired reproductiveness is another result of consanguinity in marriage, but not one of such frequent occurrence as has been thought.

II. That when the children seem to escape, the injury may show itself in the grandchildren; so that there may be given to the offspring by the kinship of their parents a *potential* defect which may become *actual* in their children, and thenceforward perhaps appear as an hereditary disease.

III. That many isolated cases, and even groups of cases, present themselves in which no injurious result can be detected. That this may occur even when all other circumstances are of an unfavourable character.

IV. That, as regards mental disease, unions between blood relations influence idiocy and imbecility more than they do the acquired forms of insanity, or these which show themselves after childhood.

V. That the amount of idiocy in Scotland is to some extent increased by the prevalence of consanguine marriages, but that

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the frequency of these marriages does not appear to be so great as has been generally supposed.

I have already indicated my views as to the way in which consanguinity in parentage tends to injure the offspring. It matters, however, comparatively little whether these views are correct or incorrect. The chief thing is to show that the injury exists, and that therefore consanguineous marriages should be avoided. This is what may influence the wellbeing of society, and it is the point of importance in the inquiry. In adducing the evidence which seems to me to prove the existence of this injury, I have been careful not to do anything which would lead to an over-estimate of its amount—an error which has been frequently committed. I think, however, that I have been able to show that the injury is not trifling, but that it is of such value as to merit serious consideration, and to regulate conduct.

But though speculation as to the *modus operandi* may properly be regarded as a secondary matter, it is not altogether profitless; and therefore, before concluding my paper, I shall somewhat amplify the views on this subject which I have already had occasion to indicate.

Let us suppose that man is represented by a series of qualities which either fall upon the straight line of physiological perfection, or which have a greater or less divergence from it on either side, above or below.

Let us also suppose that it may be accepted, as true in a general sense, that parents live again in their offspring. Though the child is not the exact algebraic sum of his parents, yet both are constantly expressed in him, and the *plus* qualities of the one, or those above the physiological rule, are either increased by the corresponding qualities of the other parent, if their divergence be in the same direction, or they are diminished by them, if the direction of divergence be different. In the first case there is an increased departure from the normal line, *plus* being added to *plus*. In the last

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case, on the contrary, there is an actual approach to the line, *minus* neutralising *plus*.

Let us now take some known transmissible peculiarity—a temperament, for instance, than which perhaps nothing more certainly passes from parent to child, and which, as a peculiarity, involves both *plus* and *minus* qualities.

And let it be admitted that there are few family traits so constant as temperament,—that is, that among persons closely related to each other the same temperament is almost sure to appear with frequency. In a blood-alliance, therefore, the chances are much greater that a husband and wife will have the same temperament than in an alliance without kinship.

Let us suppose such a blood-alliance, and that man and wife do both exhibit the same and a well-marked temperament. Their child is thus liable to receive it from both sides.

It is of course *possible* that he may not receive this temperament at all but one very much opposed to it, just as he may not inherit a predisposition to insanity though both his parents have been insane, but it is certain that the risk is great that he will do so.

Keeping to temperament as the transmissible peculiarity which we use in illustration of the subject, and supposing the child to receive from both parents the same temperament, then it is highly probable that it will appear in him in a stronger form, and the divergence from the perfect state will be augmented on both sides—the *plus* strengthening the *plus* qualities, and the *minus* the *minus*. The balance of development may thus be seriously disturbed, and high disproportions may arise, which pass the limits of a temperament and become acknowledged or recognised defect.

It is clear that the chances of such a result would have been lessened if one parent had come of a different stock, and, therefore, that the more extensively consanguineous marriages prevail, the greater is the risk of finding in the community all sorts of transmissible peculiarities dangerously intensified. Such unions also tend certainly, and in a similar way, to increase the power of the hereditary transmission of disease, and they practically augment the risks of evil from that source.

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It very frequently happens, in investigating the history of a cousin-marriage, that the defect which appears in the children has been found to have appeared also among the progenitors of the children. Such a case we would naturally call a simple one of hereditary transmission, assigning no part to the consanguinity. A large number of cases of this kind have come under my observation. But when they have been minutely inquired into; when the history of other marriages, not between cousins in the same family, has been examined and contrasted with those which were between cousins; and when the injury appearing among the children has been compared, both as to extent and severity, with that which had appeared among their ascendants, no doubt has been left on the mind that the consanguinity had given force to the heredity.

What has been held to be true of a mere temperament would of course be true also of any other transmissible peculiarity, defect, or disease. Take deaf-mutism, for instance, and with reference to it we happen to have some interesting facts. It has been ascertained that if a deaf-dumb person is married to one who hears, the chances of their having a deaf-mute child will be 1 to 135; but if deaf-mute persons intermarry, the chances rise to 1 to 20.* This is a remarkable fact, and well illustrates my argument. A similar (though perhaps not the same) rise in the rate of production of deaf-mute children would follow the marriage of deaf-mute persons with their cousins, since it is perfectly well known that the hearing members of a family in which deaf-mutism occurs, have often themselves such a possession of the defect as to make it potential in reproduction. A deaf-mute, therefore, in marrying his cousin, would do, more or less nearly, the same thing as if he had married another deaf-mute, so far as concerns his children. He would do this even if his cousin heard; but if he chooses a wife who is both his cousin and also like himself a deaf-mute, then the chances of the defect occurring among his children become nearly as great as he can make them.

These views, as to the way in which consanguinity in

* Buxton, *Causes of Deaf-dumbness*, p. 13.

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parentage tends to injure the offspring, by no means exclude the possibility of there being also a something intrinsic in the consanguinity itself, which has the same tendency. Indeed, as already stated, it appears more than probable that such a something really exists.

Kinship in the parents may operate injuriously on the children in more ways than one. It does so, however, so far as my inquiries have shown, chiefly by giving an undesirable or dangerous force to transmissible qualities.

THE END.

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